

MacUser

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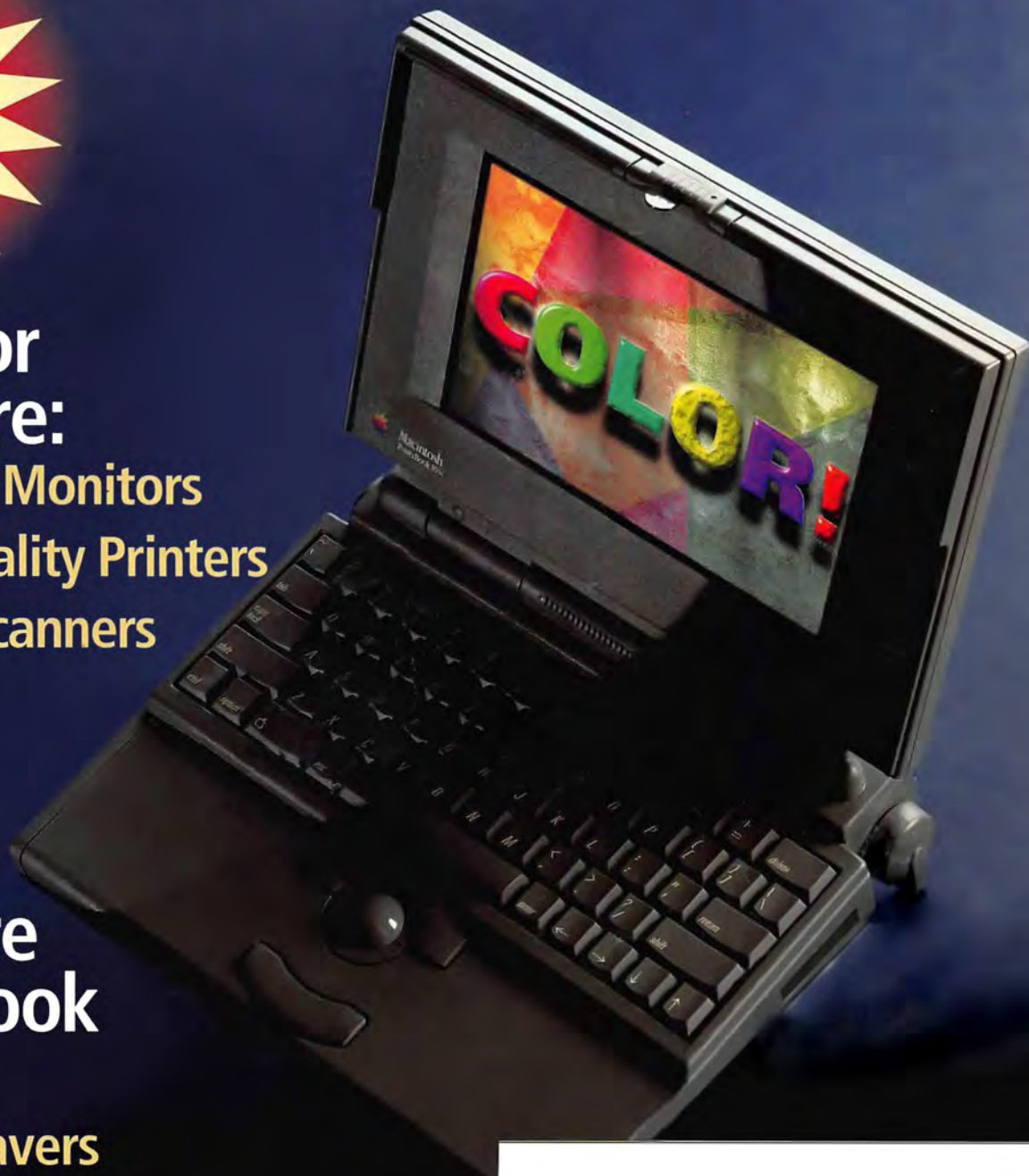
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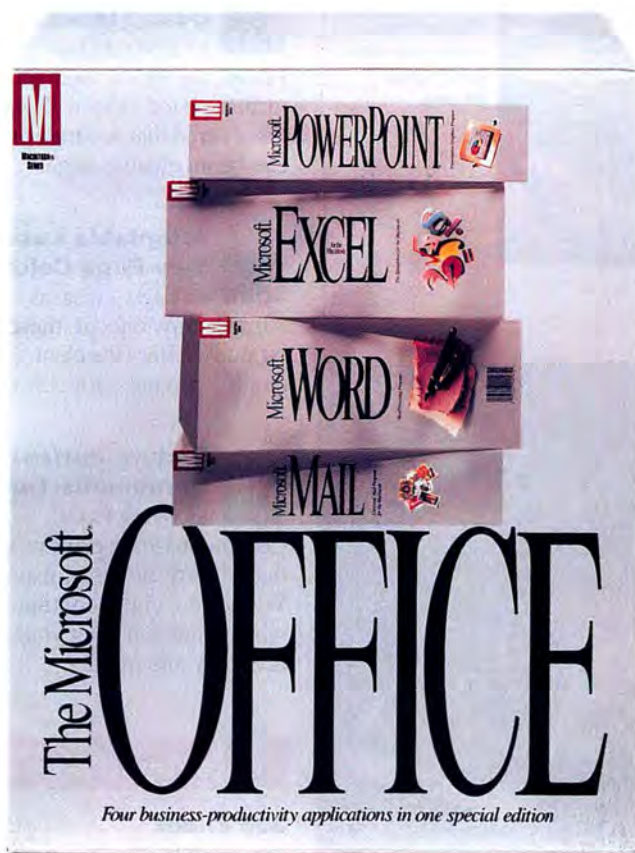
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On the cover: MacUser Labs project leader Sean Safreed used Painter 2.0 to create the image displayed on Apple's new color PowerBook 165c. Cover photo by Fred Stimson



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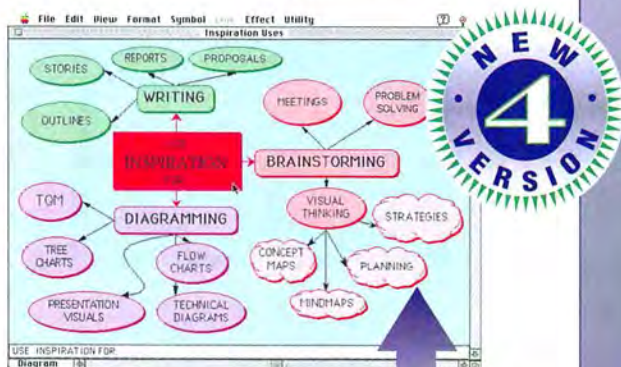
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About

MacUser The Color of Macintosh

Apple introduced its first color Macintosh six years ago. So, can we do color yet? Does the color in the image match the color in the imagination? Can we reproduce color consistently across platforms, devices, and lighting conditions?

"Well, not yet," says Bruce Fraser, who wrote this month's lab reports on color input and output devices (see "Getting the Picture: Color Flatbed Scanners," page 106, and "Picture Perfect: Continuous-Tone Printers," page 150). "Or at least not easily."

In attempting to move color processing in-house and out of the expensive prepress houses, today's computer-color coordinator must deal with a confusing assortment of color issues. There's color capture — getting the colors of the outside world into the computer — which recently got a boost from Kodak's Photo CD format.

Then there's color management — keeping color consistent — which is taking a whole new twist with Apple's system-level color-management architecture, ColorSync. There's also color-image editing — manipulating color images — which is done with software such as Adobe Photoshop. Finally, there's getting the color image out of the computer. This process includes color separations and color corrections, tasks that are facilitated by software such as Eddy Award finalist ColorAccess, from PixelCraft.

Ah, if only it were so easy.

Acquiring the right tools is only the beginning. "Color is tremendously complex," Bruce says, "in part because it exists only in the brain. We can measure wavelengths of light, but we can't measure the subjective aspects of color perception. It's very hard to quantify human sensation." Then there's the cultural dimension. "We think rainbows have seven colors. Russians think there are eight. And some Africans speak in terms of textures rather than colors."

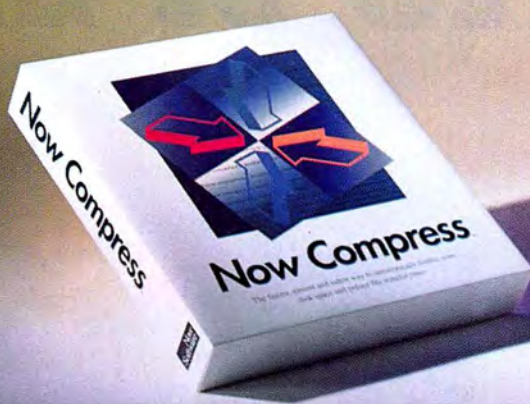
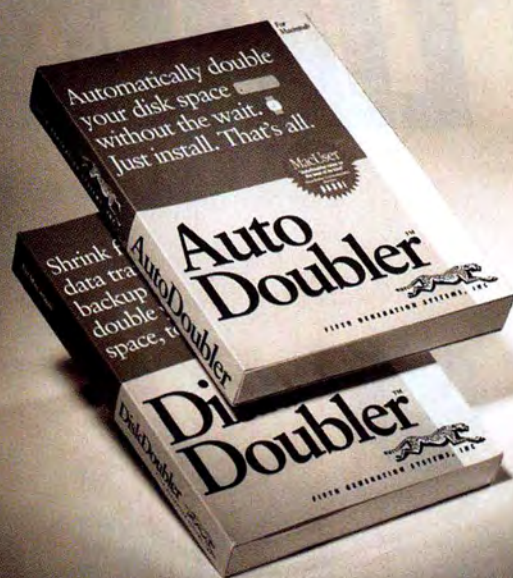
Despite such obstacles, recent advancements in desktop color technology are enabling people to use color in ways that were impossible before. These days, art directors use dye-sublimation-printer output instead of expensive Matchprints, doctors use color imaging for medical diagnosis, and the U.S. military equips its aircraft carriers with Eddy-Award-winning continuous-tone color printers.

Lots of wrinkles remain to be ironed out, though, and color coordination may never be exactly easy. But the good news is that substantial savings of both time and money can be realized with equipment available now — as you'll see in this month's three lab reports on color input (scanners), color display (monitors), and color output (printers).

— Nancy Groth



Contributing editor Bruce Fraser takes a colorful view of printers and flatbed scanners.



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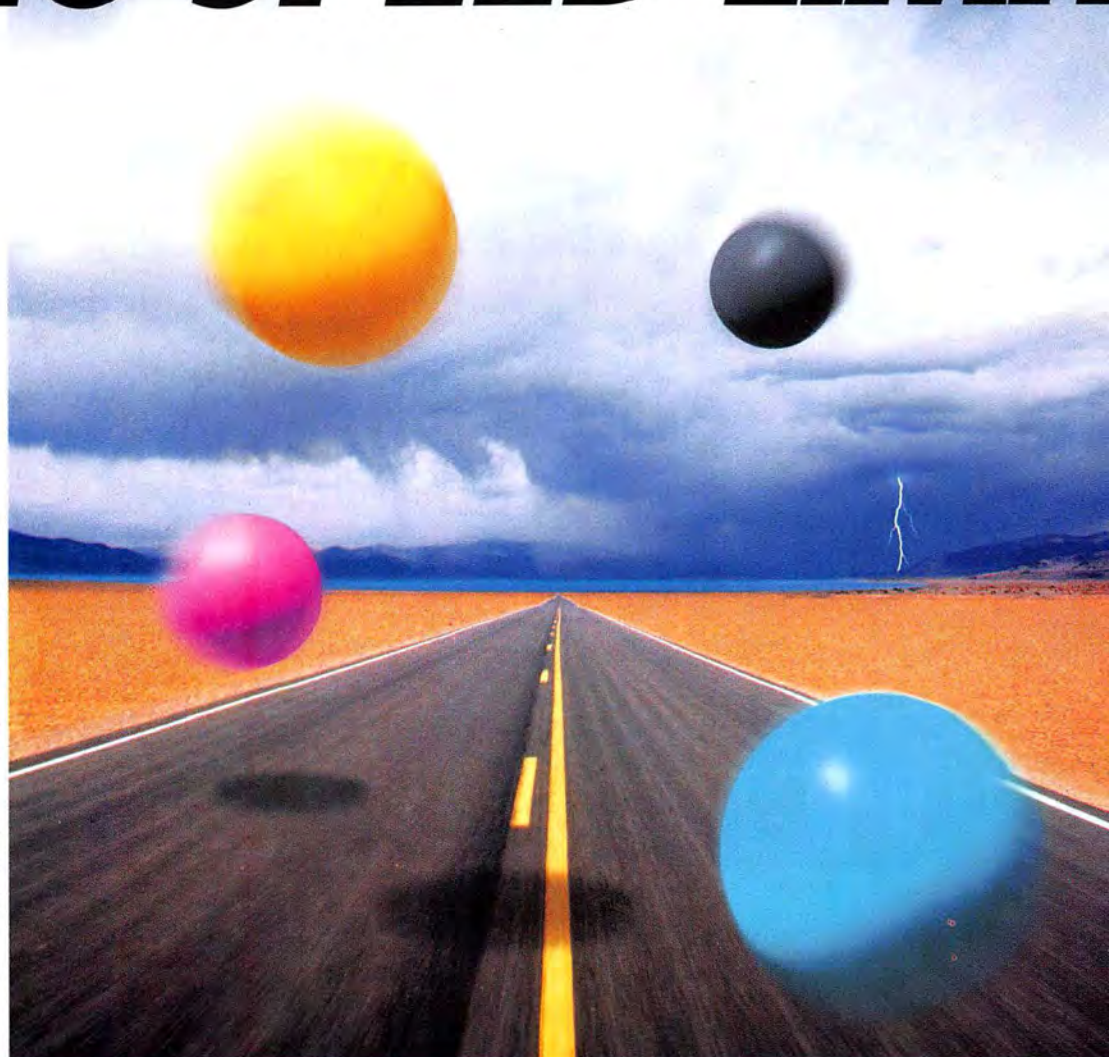
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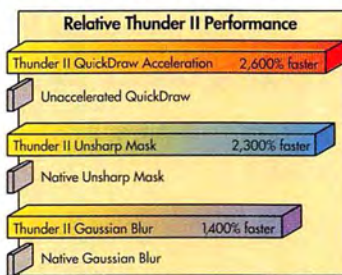
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CIRCLE 136 ON READER SERVICE CARD.



LETTERS

Brian Jones' letter about a salesperson's inability to demo a Performa ("Housewares, Lingerie, Macs," February '93, page 14) drew responses the way a going-out-of-business sale draws bargain hunters. Similar tales emerged about a variety of stores. In Decatur, Georgia, E. A. Daley Stripling's husband snickered, "I told you so," when an Office Depot salesperson couldn't show the difference between a Mac and a PC. Smelling an opportunity, Richard Ross, a computer specialist at BizMart, suggested Brian swing by his Albuquerque, New Mexico, store. But Eric Palmer's experience at a Sears in Dubuque, Iowa, sums it up: "There were no balls in the mice. First-time users wouldn't know how to use MouseKeys. How could they use the Mac without balls in the mice?"



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letters become the property of MacUser, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

Junk-Mail Hit List

I can understand Andy Ihnatko's feelings about special advertising in mail-order catalogs ("Money Talks," February '93, page 29), but I disagree with him. Mail-order companies are entitled to tap any possible source of revenue to fund production of their services. How are they any different from MacUser, which certainly does not give away its advertising space?

Corwin R. Slack
via ZiffNet/Mac

I didn't say that those advertising implants were wrong, just that (a) I didn't like the idea, myself, and (b) I really think there should be some sort of disclaimer in the ads and catalogs. Judging from the reaction of folks who've read the column, most of them were unaware that such practices existed. — AI

Right on, Andy Ihnatko! Go one step further: Say no to junk mail by making it clear to magazines, credit-card issuers, professional organizations, and stores that your name and address are your personal property and are not to be provided to any other person or organizations for any reason. Send unsolicited mail back to the sender in its postpaid envelope, with instructions to take your name off the junk-mail list. Then tie up the sender's toll-free lines with the same demand.

You don't have to give your address to qualify for warranty coverage, although it might help the manufacturer notify you about a dangerous, defective product or a recall. As for phone numbers, American Express and VISA prohibit merchants from demanding a phone number as a condition

of accepting their cards. If the merchants insist, give 'em your office fax number.

Robert Alan Soltis
La Jolla, CA

Andy says that companies that sell customer information without the customers' informed consent are "weasels." I wonder how he'd feel if it turned out that he worked for a "weasel?" I regularly receive mail from MacUser offering me a gift and entry into some sort of drawing — if I would be so kind as to tell you a little more about myself.

If you're compiling this data to create statistics on your subscriber base, the survey could (and should) be anonymous. If, as I suspect, you are using the responses to the survey for the purpose of creating mailing lists, then you ought to take what Andy says to heart

Dear Mr. Sculley ...

With the tenth anniversary of the Macintosh approaching, it may be time to revive old marketing strategies, as evidenced by the responses to our February question, "What's your idea for Apple's next advertising campaign?" Jon Valonis, of Lake Forest, Illinois, submitted a pencil sketch in which a person (it's hard to tell the gender) wearing a track outfit has just smashed with a hammer the IBM logo and now looks balefully at a giant wall of video monitors on which Bill Gates' smirking visage appears. It's titled, appropriately enough, "Round 2." The only trouble with your storyboard, Jon, is that Gates looks less like Big Brother and more like the toddler in *Honey, I Blew Up the Kid!*

Building on an earlier slogan, M. Amos Clifford, of Visalia, California, suggests, "The Power to Barely Keep Up." An Apple Macintosh gives you a fighting chance to meet the new expectation: Double your output without increasing your hours." M. Amos goes on to point out that "this expectation, and the deterioration in quality of life that it entails, was made possible by ... the existence of the Apple Macintosh!"

But Robin White, of North Little Rock, Arkansas, begs to differ: "Apple. Computers for people who have a life." This slogan was

submitted in MacPaint-style handwriting printed on an ImageWriter with multicolored ribbons, proving Robin's point.

Because Apple's appeal to the mass market is at the core of the new campaign, Bill Woodall, of Mineola, Texas, cuts right to the chase: "Apple's new advertising campaign ought to insist that the guy at Sears knows how to demo the Performa. The only problem with that is that the guy at Sears would have to know how to demo the Performa."

What has more mass appeal than food? According to Brett M. Harnett, of Marlborough, Connecticut, Apple should capitalize on the success of its "pragmatic menus," once considered a toy but now emulated by Microsoft and others. "If you want to sell Macs to an entry-level market, take a tip from the restaurant industry: 'Even our toughest critics like our menus. You will too.'"

But recognizing that cute sells product (how else do you explain the Pillsbury Doughboy?), Lucy Baccaro, of Narberth, Pennsylvania, doodled a frolicking fellow named Adam who "symbolizes Apple's fun, enthusiastic, spirited approach to 'work.'" Move over, Energizer Bunny!



and disclose your intentions fully.

Robert Lenoil

Mountain View, CA

Well, we don't require anything more than a name and address before we'll sell you a magazine, and newsstand buyers don't even have to give us that! Will you get other Mac-related mail as a result of subscribing to MacUser? Do mice have balls? The answer in both cases is, Maybe. If you want us to keep your name private, just call or write to the subscription folks at the number and address printed in "How to Reach Us" on page 4 of each issue. As for you, Robert, you're going on the special mailing list for readers who call us weasels. — JB

Need-to-Get-a-Grip User

In addition to characterizations such as "creative," "intuitive," and "just-a-little-bit-ahead-of-DOS-users" that we Mac users so gladly ascribe to ourselves, it appears that more than a few need to own up to "impatient," "impractical," and "need-to-get-a-grip." Your February '93 article "System 7 Required," page 257, names just a few recent additions to the rapidly growing stockpile of gadgetware that is pouring into the Mac community.

Although the title of "power user" may be a noble enough aspiration, is there really anything powerful about users who have such a problem with waiting a full two seconds to change a filename that they'll pay \$100 for a utility that lets them do it right away? There may be those who have the money, RAM, and time to perpetuate a market for such fluff, but the rest of us would be better served by developers who put their time and efforts into more-genuinely worthwhile products.

Timothy N. Coble

Nashville, TN

Which Mac?

In evaluating the relative merits of the Mac models I'm considering buying, I have turned to MacUser for assistance. While you run profile after profile on the latest accessories, upgrades, and other snappy items, you offer no advice, comment, or analysis on the fundamental decision of which model to buy. Why ignore this most essential question?

Robert Ebeck

Boston, MA

We haven't. Check out "How to Buy the Right Mac" (The MacUser 1500 [1993 special issue], page 16) as well as our regular "Shopping List" feature. — PP

Coffee, Tea, or Mouse?

In "The PowerBook Survival Guide" (February '93, page 168), you suggest bringing along an external mouse to use with your PowerBook on an aircraft or in a hotel. Using an external mouse in a hotel sounds great, but most airlines don't permit passengers to use laptop computers with external corded mice or keyboards after the aircraft has left the terminal. When the airlines first announced this, I recall a few Apple dealers even advertised that PowerBooks were approved for use on aircraft, specifically to sell people on the benefit of the built-in trackball.

Michael Shulman

via ZiffNet/Mac

Many, although not all, airlines do officially forbid in-flight mouse use. It's worth checking, however. And anytime you're asked not to do something (whether it's using a mouse or playing Prince of Persia) by an airline employee, it's wise to obey, unless you like being greeted by law-enforcement officers upon touchdown. — JB

A Fault and Battery

The article on battery management ("Taking Charge: PowerBook-Battery Management," February '93, page 194) was great—for everyone but PowerBook 100 users, that is. Was I just not reading closely enough, or was there basically no mention of charging tips or alternative batteries for those of us in the lead-acid crowd? As I understand it, the lead-acid battery is an entirely different animal from its NiCad cousins. Personally, I'd love to know what alternatives there are to the battery currently in my PowerBook 100 and how to optimize my power usage.

John Hadden

via ZiffNet/Mac

Many of the power-saving techniques we described apply to PowerBook 100 batteries: setting your processor to system rest, spinning down your hard drive, and keeping the backlighting turned down. One advantage of lead-acid batteries is that you can recharge them at any time without fear of limiting the battery-charge capacity. Alas, as far as we know, there are no third-party replacement batteries for the PowerBook 100. — DC

House of Cards

I very much enjoyed "Setting the New Standard: 16-Inch Color Monitors" (January '93, page 104), but I felt left a little

short. A major component in monitor quality and performance is the color card you use. I would have appreciated some mention of which card you used for the tests and a comparison of the popular cards available.

Stan Huie

Fredericksburg, VA

We ran our tests with a Quadra 900, which has on-board video (it was loaded with 2 megabytes of VRAM [video RAM], for millions of colors) and then repeated them, also on the Quadra 900, for those monitors that came with cards (the Sony CDP-1604S and the RasterOps Sweet 16 did not, for example). We found little performance difference between the on-board video and the interface cards. According to our tests, the quality of the monitor itself was the determining factor in performance. For example, the extra value you get from E-Machines' Futura MX video card is in features such as pan and zoom, acceleration, and auto-centering. For more on video cards, see "Chasing Rainbows: Accelerated-Video Cards" (May '92, Buyer's Guide page 16). — MF

Taxed Out

MacUser does its readers a disservice when it tells only part of the story. The response to the "Death and Taxes" letter (February '93, page 13) stated that ChipSoft "just informed us that a newly discovered bug prevents the program [MacInTax] from installing when virtual memory is turned on" (emphasis added). When we informed MacUser and any possibly affected user of this in October, we explained a workaround, and we made fixing it a top priority. We understand the constraints your long publishing lead time puts on your editorial content, but some of your readers may not. No one who purchased MacInTax after October 24, 1992, was affected, and absolutely no user who purchased the product at retail was affected. The situation was quickly resolved and is not a cause for concern. We believe our users will be very happy with MacInTax this year.

Alan Gleicher

President, Personal Sales Division

ChipSoft, Inc.

via ZiffNet/Mac

At press time, the time frame for the fix was undetermined. We're glad it was fixed in a timely manner. We're also glad that ChipSoft is working so hard to earn back the trust of its users after the problems that plagued last year's edition. — JB

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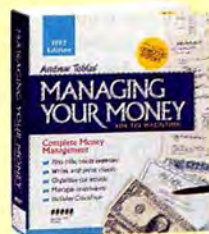
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DOS — IBM PC, XT, AT, PS/1, PS/2 or IBM-compatible. DOS 3.0 or later. 512K RAM. Hard Disk. All rights reserved.

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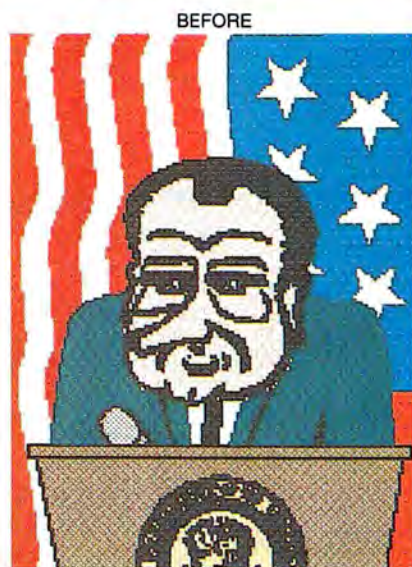
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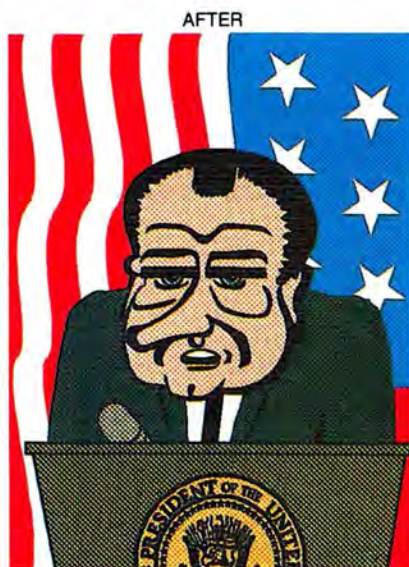
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CIRCLE 91 ON READER SERVICE CARD.

LETTERS

Trapped!

Readers of "The Four-Color Trap" (February '93, page 217) may find the caption to Figure 12 misleading. When creating traps, Aldus TrapWise never disturbs the dominant color, because that color defines the visual integrity of the artwork. The terms *choke* and *spread*—descriptions derived from distinct tasks in photomechanical trap generation—are becoming obsolete with computer-automated trapping. With photomechanical methods, the subordinate color is always displaced, and the operator's decision whether to spread or choke is simply based on whether the subordinate color sits in front of or behind the dominant color, respectively. Digital color-edge analysis and trap construction open the door to manipulations that are prohibitively expensive in the photomechanical realm.

Also, a designer who manually traps a portion of a page using the techniques outlined in the article and then asks a PostScript-service provider to run the file through a postproduction trapping tool such as Aldus TrapWise and Scitex Full Auto Frame to handle more-complex artwork can expect undesired results. For these reasons, we do not believe that the users' design applications should apply object-level trapping in those programs.

Jeff R. Harmon

Print Production Quality Assurance
Aldus Corp.

Bigger ≠ Better

I have begun to dread every new, invariably larger revision of major Mac applications. Each one is eventually purchased by one of my coworkers, causing a forced round of upgrades by all for compatibility. I'm waiting for the release of DiskQuadrupler, having failed to figure out how to get Excel 4 down to the size of Excel 3, without all the add-ins.

As I was reading *The MacUser 1500* (1993 special issue), it occurred to me that *MacUser* is part of the problem. Every publisher wants to get a higher mouse rating, and you almost invariably give more mice to the more feature-laden product. Please give developers a hint: How cheap, fast, small, and easy would a word processor have to be to get as many mice as Microsoft Word does, if it had only half the features?

Joe Veranth
via ZiffNet/Mac

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The Critics' Choice For Best Picture.

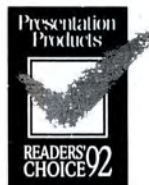
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CIRCLE 77 ON READER SERVICE CARD.

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We're sorry: We made ClickChange useful.

**We set out to make
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137% wackier, but...**

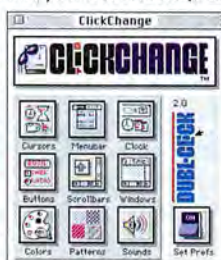


Along the way, we goofed and built in some useful features too.

Like a menu clock (oops!). Like space-saving icons to replace text in the menubar (d'oh!). Like animations to help you find your lost cursors (well, at least they look cool). Like windows that can be shrunk down to just their titlebars, and expanded again. And of course, our famous scrollbars with dubl-arrows at each end.

ClickChange is still the fun way to personalize your Macintosh, though.

Replace drab old cursors, desktop patterns, and menu titles with exciting, colorful alternatives. Color schemes accompany your choice of button, window, and scrollbar styles.

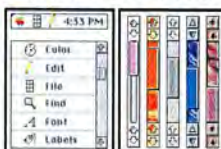
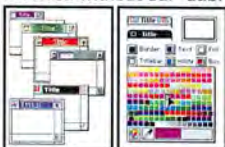


Cursors. Replace those 5 boring standards with color, animated cursors—even create and edit your own! **CursorFinders.** Ever lose your cursor? Type a key and one of our flashy graphics exposes bashful cursors.

Menubar Icons & Clock.

Space at a premium? Our compact menu icons and clock won't cramp your style.

Buttons & Scrollbars. Tired of those flat 50's looking controls? Slip into one of our sleek, modern, 3D designs. If you've got a big screen, you'll wonder how you survived without our "dubl-arrow" scrollbars.

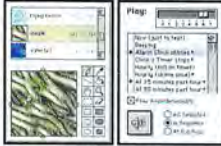


Windows. The perfect frame to display those fancy new buttons and scrollbars in. Lots of cool styles!

Colors. Colorize windows, menus, buttons, scrollbars and more. Save color schemes to suit every mood; many already included.

Patterns. Brighten your screen with wildly refreshing alternatives to old gray desktop & scrollbar patterns.

Sounds. Set sounds to play at startup, shutdown, beep, insert/eject disks, copying files, emptying trash and other major Macintosh events.



Hey, MacUser dug it. ClickChange 1.0 was rated 4.5 mice. **Requires:** a MacPlus or newer, System 6 or 7, and a sense of humor. \$89.95.

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Not just funny sound effects, but over 4mb of hysterical comedy written around the Mac and tailored for ClickChange sound events. \$29.95.



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LETTERS

We've often given products lower ratings because they mismanage their features. If a product offers loads of features while maintaining a manageable interface that lets you ignore the ones you don't care about and offers this at a competitive price, it tends to get a higher rating. Lack of features is rarely the only reason a product gets a low rating; that lack is usually coupled with weak interface, documentation, support, stability, and the like. — JZ

Reviewing MacUser: ½

I recently subjected your magazine to a critical and demanding series of tests (such as you do for product reviews), and it failed miserably. An important function of a magazine is to shield a user's eyes from the sun or other strong ambient light when the user is taking a nap or otherwise resting. I used a common paperback (294 pages and approximately 7 ounces) as a benchmark and found the paperback far superior in most ways.

The sheer weight of your publication made it difficult to find a comfortable angle at which to place it on my face while I was in a prone position. The traditional method when using a paperback is to lie with one's nose in the fold, but with *MacUser*, I risked nose injury. I shifted the product to one side for safety but then ran into the problem of uneven light shielding. Although the depth of your articles, in addition to the large number of product reviews and informative advertisements, is a plus for some uses, it detracts from the magazine's primary function.

Another serious flaw is that whenever I opened my eyes, I found myself distracted by what was in front of me (an article on OCR software, I think) and ended up wasting valuable napping time by reading.

For these reasons, I can give your magazine only a 1.5-mouse rating. I hope you understand.

Matt Haines
Burbank, CA

Let Sleeping Duos Lie

In "The Convertible Mac: The Macintosh Duo System" (December '92, page 144), Russell Ito states, "the 210 and 230 automatically go to sleep when you close them." Later in the article, he says, "the Duo Dock won't let you insert a sleeping PowerBook." Don't you need to close a PowerBook (thereby putting it to sleep) before inserting it into the Duo Dock (which won't accept a sleeping PowerBook)? As Howie Mandel so nicely put

it, "Something weird is going on here!"

Jonathan W. V. Rentzsch
Waukegan, IL

Putting a PowerBook to sleep doesn't turn it off; it merely puts it "on hold," if you will. The Duo system requires that a PowerBook 210 or 230 be "off" when inserted into the Dock. — RI

Rip Van Dvorak

Hey, Rip Van Dvorak! My goodness, writing about installing System 7 and program conflicts ("Surviving a Crash Crunch," February '93, page 362). Perhaps you've been spending too much time trying to figure out how to install a printer under Windows. The majority of applications current when System 7 was released work just fine under System 7, but the majority of INITs from that time have trouble. Virtually every application and INIT since has been upgraded. So that means you weren't even running software current from mid-1991!

Kevin Garrett
via ZiffNet/Mac

I couldn't believe that a year and a half after System 7 was released, Dvorak wrote a column about the problems of System 7! Do we have to wait another year and a half for him to write about System 7.1? Anyone who has *Dvorak's Inside Track to the Mac* ought to read any section on System 7 with a grain of salt, because according to his February column, he hadn't really used the system yet.

Patrick Emerson
Santa Fe, NM

Corrections

In "Can You Read This? OCR Software" (January '93, page 152), the toll-free number listed for CTA should have been 800-252-1442.

In February '93's New on the Menu (page 62), Kodak's address in the Kodak Diconix 180si review should have been Eastman Kodak Company, 901 Elmgrove Road, Rochester, NY 14653; 800-344-0006 or 716-253-0740.

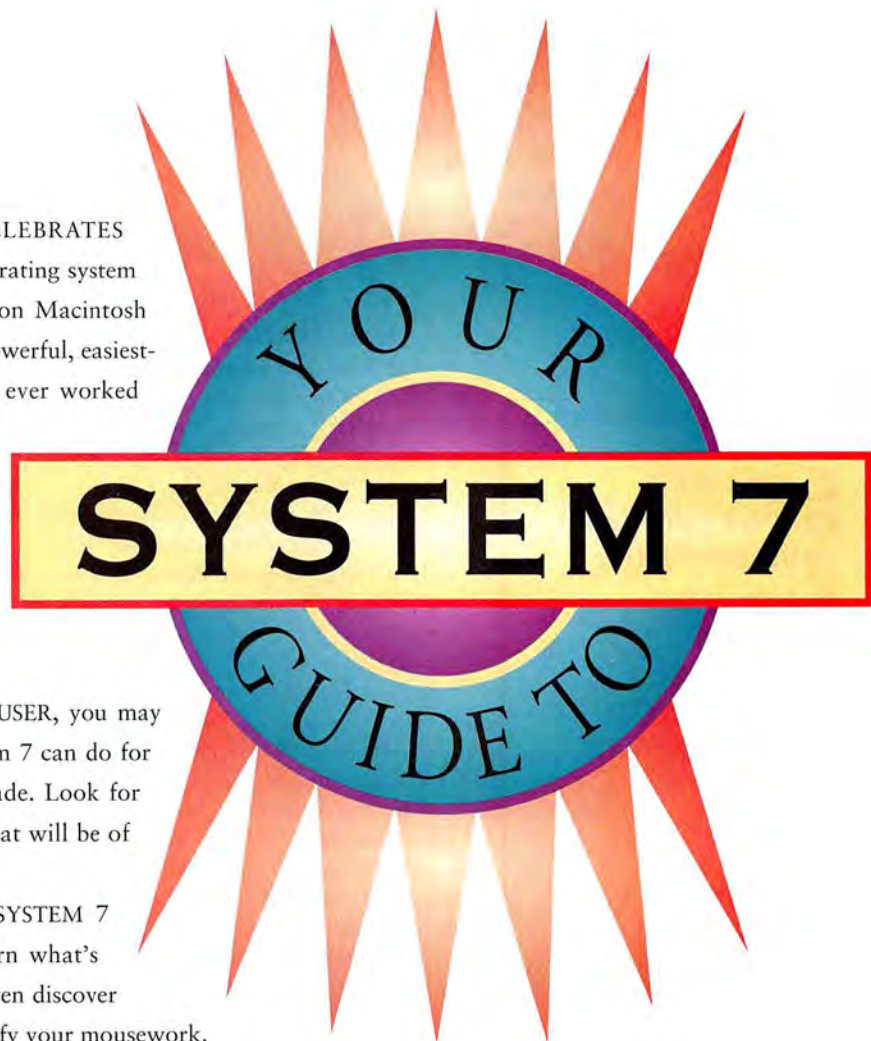
In the February '93 review of PowerBook and SCSI Display Adapters (page 210), the mouse ratings were omitted, due to a printing error. In the clarification in the April Letters column (page 20) that provided the mouse ratings, the rating for the Aura Systems Scuzzy-View should have been ½.

THIS MONTH SYSTEM 7 CELEBRATES its second anniversary as the operating system of choice for more than 5 million Macintosh users, who tell us it's the most powerful, easiest-to-use operating system they've ever worked with. But don't take their word for it. Read through our collection of 30 tips and techniques and see for yourself how easy it is to be productive with Apple's award-winning system software.

IF YOU'RE A SYSTEM 6 USER, you may be surprised at how much System 7 can do for you and how easy it is to upgrade. Look for the ✓ symbol next to features that will be of particular interest to you.

IF YOU'RE ALREADY A SYSTEM 7 USER, keep reading! You'll learn what's new in version 7.1 and maybe even discover a shortcut or two that will simplify your mousework.

This is the first in a series of articles from Apple Computer designed to help you get the most out of System 7. In the July and September issues of *MacUser*, we'll demonstrate still more ways System 7 can make your life easier, including tips for your favorite applications and ways to simplify working in groups.



**30 Ways
to Work
Faster and
Smarter
with Your
Macintosh**

Faster file access • Refined desktop • Multitasking power • Keyboard shortcuts • Memory expansion • Easier collaboration • Security options

1 Instant Access to Everything

The new and improved Apple menu is one of the best features of System 7. While the System 6 Apple menu contained only desk accessories and control panels, the System 7 menu



The System 7 Apple menu gives you instant access to all your important applications, control panels, documents, folders, and hard disks.

gives you immediate access to anything on your Mac—applications, desk accessories, control panels, documents, folders, hard disk, even AppleShare volumes.

You decide which items will appear on the pull-down menu. To add something, drag it (or preferably, its alias) into the Apple Menu Items folder, which is located inside the System Folder. The item will immediately appear on the menu without you having to restart the Mac. You can add as many items as you want. If the list gets too long to fit on-screen,

it will automatically scroll. To remove something from the Apple menu, just drag it out of the Apple Menu Items folder.

2 Keyboard Shortcuts

System 7 lets you navigate the Finder without lifting your fingers from the keyboard. For example, you can use the arrow keys to select the next file in a row or column. The Tab key selects files in alphabetical order (Shift-Tab selects them in reverse order). Typing the first letter(s) of a file's name will select it. In each case, the window will automatically scroll to display the selected file. To open a selected folder or file, use Command-down-arrow.

To navigate through folders, hold down the Command key while clicking the window's title bar. A pop-up menu will appear, showing the path from the current folder to the desktop and allowing you to move quickly between folder levels.

Fast Fact: For a complete list of keyboard commands, select Finder Shortcuts from the Help menu when you're in the Finder.

3 Multitasking

System 7 lets you work faster and smarter by keeping several applications open simultaneously. For example, you don't have to quit Excel to use FileMaker Pro. Instead, you can have both programs open, along with TouchBase and Fax-Manager, and switch among them at will. (The number of programs you can have open depends on how much memory is available.)

To switch to another program, click in one of its windows or use the Application menu (right end of

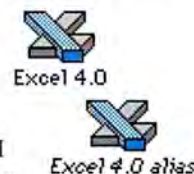
the menu bar). Click anywhere on the desktop to return to the Finder. The Application menu's Hide commands let you reduce screen clutter by removing the windows of programs you aren't currently using, including Finder windows.

Fast Fact: You can hide the current application by holding down the Option key while you select another program on the desktop or from the menu.

4 The Ultimate File Organizer

Ever wish you could be in two places at once? Maybe you can't, but your files can, through the magic of aliases, one of the most powerful and versatile features of System 7.

An *alias* is a duplicate file icon that lets you open files, folders, and disks by remote control. For example, if you have an alias of MacWrite II on your desktop, you can double-click it and the Mac will launch the *original* program, which may be buried three levels deep in your Applications folder.



Using the Make Alias command (File menu), you can create several aliases for the same file and put them in different places—on the desktop, in the Apple menu, in different folders, even on another disk. Each alias serves as a pointer to the original file, wherever it resides. And because an alias duplicates the file's icon, not its contents, it takes up just 1 to 2K of disk space.

Aliases give you the best of both worlds: organized files *and* instant access to the items you use most often. Use aliases to store your invoices in folders organized by month *and* project—simultaneously. They also provide an ideal way to access a program, such as Quark-

XPress, that must remain in the same folder as its associated files. Simply put a QuarkXPress alias in the Apple Menu Items folder, and you have a quick path to the original program.

Feel free to move the original file anywhere you want; its alias will still be able to find it. Likewise, you can rename an alias and it will retain its link to the parent file.

5 Improved Font Handling

Font lovers rejoice: System 7.1 stores all your fonts in a *single location*. The new Fonts folder holds TrueType, PostScript, and bit-mapped fonts. (Fonts can no longer be installed in the System file itself.) If

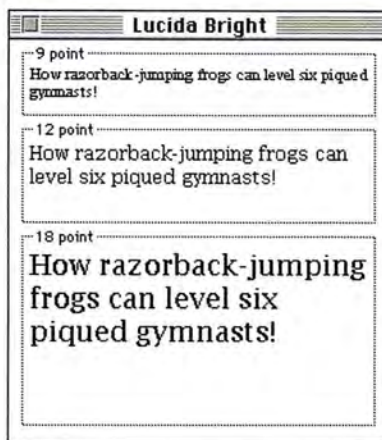
you're a System 7.0 user, the Fonts folder alone may be worth the upgrade to System 7.1.

When the Mac starts up, it automatically looks in the Fonts folder and opens up to 128 font suitcases. Because a font suitcase can hold as much as 16 megabytes of TrueType and bit-mapped (screen) fonts, you can install all the fonts you'll ever need.

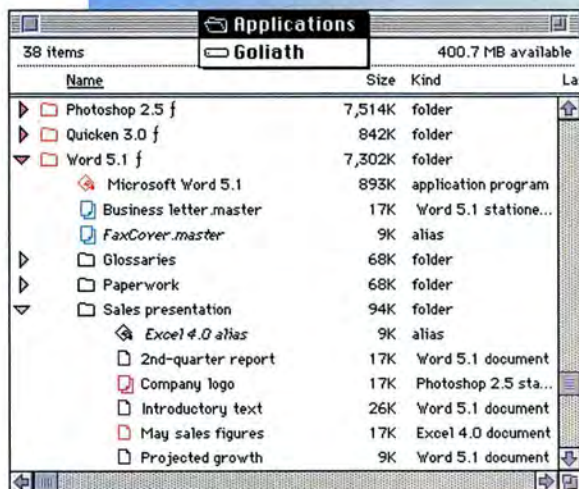
Installing and managing fonts is also easier—and faster—than ever before. The slow, cumbersome Font/DA Mover is a thing of the past. To install a font file or suitcase, you simply drag it onto the System Folder icon. The Finder will automatically store it in the Fonts folder. To uninstall a font,

remove its file from the Fonts folder.

If you double-click a font suitcase, a window will open, displaying the suitcase's stash of TrueType and/or bit-mapped font files. Double-clicking an individual font file will bring up a handy font sample.



Apple's TrueType fonts display sharp type at any point size, on-screen and on paper. Double-clicking a font file brings up this handy font sample.



6 New Outline Views

In the System 7 Finder, list views (Name, Size, Kind, Label, Date) are more versatile and informative than ever before. For instance, you can view more file details, including folder sizes, version numbers, labels, and comments. (You can turn these options on and off in the Views control panel.)

But the most valuable addition to list views is the ability to display files in outline form, which lets you see the files inside a folder without opening a new window. In any list view, simply click the small triangle next to a folder to display its contents as an indented outline within the existing window. You no longer have to waste time and desktop space opening window after window to get to the files you need.

You can select multiple items in list views by dragging out a marquee, just as you can in icon views. To select individual items, including those in different folders, use the conventional Shift-click approach. To quickly switch from one list view to another (say, from Name to Date), click the desired title in the window's header. You can also opt to have the header display disk information ("34.5 MB in disk, 3.4 MB remaining").

Fast Fact: When viewing files in outline form, you can expand and collapse folder outlines from the keyboard by using Command-right-arrow and Command-left-arrow. Adding the Option key to this sequence expands and contracts all subfolders as well.

7 Finding Files Faster

For the first time, the Finder can actually find. Not only that, but it also fetches. The System 7 Find command (Command-F) is a fast, powerful file-searching utility that saves you precious time and frustration in locating and opening needed files.

When it finds a match, the Mac automatically opens the folder window and shows you the file, saving you the effort of retrieving it. You can open the found file or continue searching by choosing Find Again (Command-G).

You can do a quick search based on characters in a filename, but the Find command's real power lies in its More Choices dialog box, which can locate files based on their size, kind, label, creation or modification date, version (for applications), and comments (in the Get Info window). It even tracks down locked files. You can check all disks at once or limit the search to a specified disk or folder.

Fast Fact: If you want the Mac to find and select all of the items that meet your criteria, rather than stop each time it locates a match, click the checkbox labeled "All at once."

8 Editing PageMaker Graphics

Versions 4.2 and 5.0 of PageMaker make it easy for you to edit graphics that you've already placed on the page. Simply select a graphic and choose Edit Original from the Edit menu (or Option-double-click the graphic). PageMaker will immediately open the image in the graphics application that created it. For example, if you



use the command on an EPS illustration created in FreeHand, PageMaker will launch FreeHand and open the original illustration.

Fast Fact: If you hold down the Shift key while selecting Edit Original, PageMaker will let you select another program to use for editing. You could, for instance, choose to use Photoshop to edit a TIFF image that was originally created in Canvas.

FreeHand 3.1 and ColorStudio

1.5 users get an added bonus: They don't have to reimport edited images. Instead, special "hotlinks" between these programs and PageMaker automatically update placed graphics as soon as you save the revised illustrations.

This time-saving technique is one benefit of Apple Events, a powerful feature of System 7 that enables programs to work cooperatively, exchanging information and even controlling one another.

System 7 vs. Windows: You Decide



System 7 and Windows 3.1 both claim to help you work quickly and efficiently. But what's the real story? Consider, for example, the basic task of accessing information. System 7 has built-in features that let you find and open files much faster—and more easily—than you can with Windows 3.1.

But don't take our word for it; see for yourself.

Opening Files

Under System 7, the Apple menu gives you immediate access to frequently used applications, documents, and folders. No matter what application you're in, you can open another program or document simply by selecting it from the pull-down Apple menu. (See Tip 1.)

To open a file on a PC running Windows 3.1, you must first press Ctrl-Esc to bring up the Task List. You must then double-click the Program Manager's name to open a window that displays various program-group icons. From there, you double-click the appropriate program-group icon to open the window that contains your document. Finally, you double-click the appropriate file icon to open your document.

Tracking Applications

On the Mac, double-clicking a document's icon automatically opens that file in the application that created it (if the application is available to your Mac). For example, double-clicking a graphics file created in Photoshop launches the program and places the image on-screen. You don't have to know where Photoshop itself is located. If you move the program to another folder or disk, the Mac will still be able to find and launch it whenever you double-click a document.

With Windows 3.1, it's not that simple. Double-clicking a document opens the application that created it—sometimes. Windows 3.1 loses track of the parent program if you move it to a different directory (folder) or rename the directory where it's located. When you try to open a document that was created by that application, you usually

9 More Powerful Desk Accessories

Under System 7, desk accessories (DAs) and control panels are promoted to full-fledged applications. No longer confined to the Apple menu, they can be placed anywhere—on your desktop, inside a folder—and opened with a double-click.

Under older versions of the system software, DAs provided the only means of opening more than one program at a time. But because System 7 supports multitasking, you can use several programs simultaneously, and today's DAs can do anything an application can. You no longer have to install both a DA and a more robust application for software



receive an error message that says, "The specified path is invalid."

To fix this problem, you must use the Associate command to relink the document with its application. To do so, you must match the three-character filename extension of the document with the new pathname to the application. This can be a complex task for people who don't understand the rules for DOS pathnames and filenames.

Searching For Files

With the powerful Find command in System 7, you can locate a file based on its name, size, kind, label, version, creation or modification date, lock status, or comments. (See Tip 7.) In contrast, the Search command in Windows 3.1 can only find files by name.

The System 7 Find command lets you look for a file across all of your disk drives simultaneously, while the Windows 3.1 Search command can only search one drive at a time. If the Search command doesn't find the file on drive C:, it will not automatically search the next drive. Instead, you must use the Search command again on the D: drive.

Under System 7, the Find command lets you search for a file using any part of its name: By typing just *goals*, you can locate the document named Budget Goals. To find a file in Windows 3.1, you must understand its filename extensions and wildcard rules. If you need to find a document named GOALS.DOC but only know the first part of its name, Windows 3.1 won't be able to find the file. You must type in the document's complete name, including an extension. If you don't know part of the name, you must use a wildcard character. In this case, you would type *GOALS.**.



The System 7 Find command can locate a file based on a variety of criteria, and you can search across all of your disk drives simultaneously.

such as DeskPaint.

If you double-click a System 6-era DA suitcase, a window appears, allowing you to view the contents and drag individual DAs out onto the desktop.

Drag a DA suitcase from

System 6 on top of the System Folder, and the Mac will unpack it and place the individual DAs into the Apple Menu Items folder.

You'll probably want to keep the control panels inside their system folder, so they will appear under Control Panels in the Apple menu.



But if there's a control panel you use often, such as Monitors, you might place an alias of it on your desktop for easier access. Or you could place the control panel in the Apple Menu Items folder, so that it appears on the main part of the Apple menu.

10 Automatically Updating Files

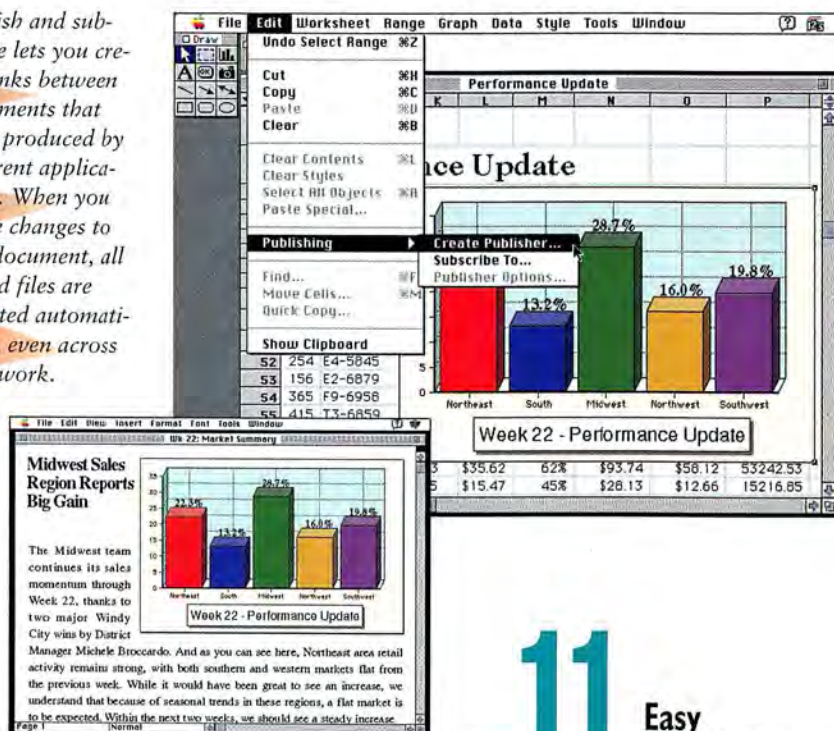
Do you create reports or presentations that rely on information produced in other programs? Perhaps you use Microsoft Word to prepare a monthly sales report, and one page contains a sales chart created in Lotus 1-2-3. The chart's sale figures are updated on a weekly basis, so each month you must reimport the chart from Lotus 1-2-3. Even then, you may not always have the latest numbers.

Under System 7, you can keep the report current—without lifting a finger—by using publish and subscribe to automatically update the chart. In Lotus 1-2-3, select the chart and choose Create Publisher (Edit

MYTH
System 7 is hard to install.

FACT
You can install it with one click of the mouse. In a matter of minutes, the Installer will automatically upgrade your Mac to System 7.

Publish and subscribe lets you create links between documents that were produced by different applications. When you make changes to one document, all linked files are updated automatically, even across a network.



menu) to make the chart available to other programs via a special file called an *edition*. In Microsoft Word, use the Subscribe To command (Edit menu) to select the edition file and place a copy of the chart in your document. Position and resize the chart as needed.

From now on, whenever you update the sales figures in the original Lotus 1-2-3 file, a fresh version of the chart will be sent automatically to all documents that subscribe to its edition, including your Microsoft Word file. Subscribing files will be updated even if they aren't open and no matter where they are on a network.

Current versions of many popular programs can share text and graphics using publish and subscribe. The list, too long to print here, includes Microsoft Excel, Adobe Premiere, Photoshop, Canvas, FileMaker Pro, PageMaker, Persuasion, QuarkXPress, ClarisWorks, DeltaGraph Professional, PowerPoint, MacProject Pro, WordPerfect, GeoQuery, OmniPage Professional, and Accountant, Inc.

11 Easy File Sharing

If your Mac is on a network, you can share files with other people without using any special software, thanks to the built-in file-sharing capabilities in System 7. Even if your network consists only of computers sharing the services of a laser printer, you can share files. The cable that connects your Macintosh computers to the printer—and to each other—is the only hardware you need for file sharing.

To begin sharing files, give your Mac a network name and turn on "File sharing" in the Sharing Setup control panel. Then select the folder, hard disk, or CD-ROM disc you want to share and choose Sharing from the File menu. In the resulting dialog box, click the checkbox labeled "Share this item and its contents."

For security reasons, no one on the network can access your shared files unless you specifically allow it. Through the Users & Groups control panel, you can restrict other

users to simply viewing files or allow them to make changes as well. If you want your files to be fully available to everyone on the network, open the Guest icon and click the checkbox labeled "Allow guests to connect."

You can share up to 10 folders or disks, each of which may contain an unlimited number of folders. You might, however, just want to create a Shared Items folder and drop into it all files and folders you wish to make available.

Other users can access your shared files—without setting up file sharing on their own computers—by opening the Chooser, picking the name of your Mac from the AppleShare list, and choosing which folders or disks they want to use. The shared items appear on their desktops as AppleShare icons. You can see who's currently accessing your files (and disconnect them if you want) by opening the File Sharing Monitor control panel.

Fast Fact: Because file sharing uses the basic AppleShare protocols, your shared folders can be accessed by Macintosh computers running System 6 and by PCs with AppleShare-compatible networking software.

12 Working While You Print

The most valuable aspect of System 7 multitasking is that it lets you continue working in one application while the Mac handles time-consuming chores in the background. You no longer have to waste time waiting for the Mac to print documents, copy files, download files from on-line services, or recalculate spreadsheets.

Instead, you can tell Microsoft Word to print a 30-page file and then switch to Canvas and work on an illustration. (Be sure to turn on "Background printing" in the Chooser.) Or you can work on a 4th

Dimension database while the Mac copies files in the background—ideal if you're backing up lots of data. This parallel processing gives you an enormous productivity boost.

13 Creating File Templates

You can turn any document—text file, spreadsheet, database, chart, graphic—into a read-only template by clicking the checkbox labeled “Stationery pad” in the file’s Get Info window. From now on, whenever you open the document the Mac will make an untitled copy of the original file. To save the new file in a different location, click the Save In button.

Now you can use the same master file over and over again without worrying about accidentally changing its contents. Make stationery pads for documents you constantly reuse, such as letterheads, business letters, fax cover sheets, company logos, and newsletter layouts.

Fast Fact: A few applications let you create stationery pads from within the Save As dialog box.

15 Talking to PCs

Tired of truncating filenames to eight characters just so you can exchange files with PC users? Then don’t. Apple’s Macintosh PC Exchange lets you retain the

cherished 31-character Mac filename while simultaneously assigning a second, MS-DOS–acceptable name that’s seen only by PC users.

For example, if you have a file named May Budget.doc, Macintosh

PC Exchange will automatically give

it an alternate name of !MAY-

BUD.DOC when you copy the file to a PC-formatted disk. (The exclamation point indicates that the name has been shortened.)

You see the Mac filename on your computer; your PC-based colleague sees the MS-DOS name. To see a file’s MS-DOS name on the Mac, click its name in the Get Info window. (You must have the System 7 File Sharing Extension installed.)

This is just one of the many



14 Protecting Your Files

It’s every parent’s secret worry: You shoo the kids away from the Mac so that you can use it, only to discover that a crucial report is missing or—horrors—your hard disk has been erased. To prevent this scenario you need At Ease, Apple’s System 7 extension that makes sharing a Mac as easy as using one.

At Ease protects your computer’s contents by replacing the Finder desktop with two screens of icons. Each icon represents a program or document you’ve chosen to make available. If you have kids, for example, you might limit the selections to educational programs and games.

Everything else remains hidden, including the Trash, hard-disk icons, and system files and commands. No one can delete, rename, or move a file; rearrange the System Folder; or alter your Control Panel settings. To access other files or return to the Finder, you must enter a password.

At Ease is a boon for novice mousers, because it makes the Mac even easier to use. There are no folders to navigate; one mouse click opens any pictured program or document. Quit a program, and you return to the At Ease screen.

If you share your Mac with children, students, coworkers, or customers, you’ll love the simplicity and security offered by At Ease. It’s the all-in-one solution that lets you rest easy, knowing your Mac is safe from document tampering or prying eyes.



At Ease lets you control which files on your Mac are available to other users. The customized desktop displays a large button for each program and document.

benefits of Apple's Macintosh PC Exchange software, which lets you directly open and work with MS-DOS and Windows files on your Mac.

16 Customizing Your Icons

Tired of staring at bland document and folder icons? Perhaps you'd like to add a personal touch to your files or simply make the icons more informative. Go to it—System 7 lets you customize the icons for most files.

First create an image in a paint-

ing or drawing program and copy it to the Clipboard. Then open the destination file's Get Info window (Command-I) and click its icon. If the icon can be modified, a box will appear around it. Choose Paste to replace the icon with the contents of the Clipboard, which are scaled to fit the limited real estate. (You can alter the existing icon by copying it into your graphics program, editing it, and pasting back the revised icon.)



Under System 7, you can customize a file's icon or turn the file into a template (stationery pad) through its Get Info window.

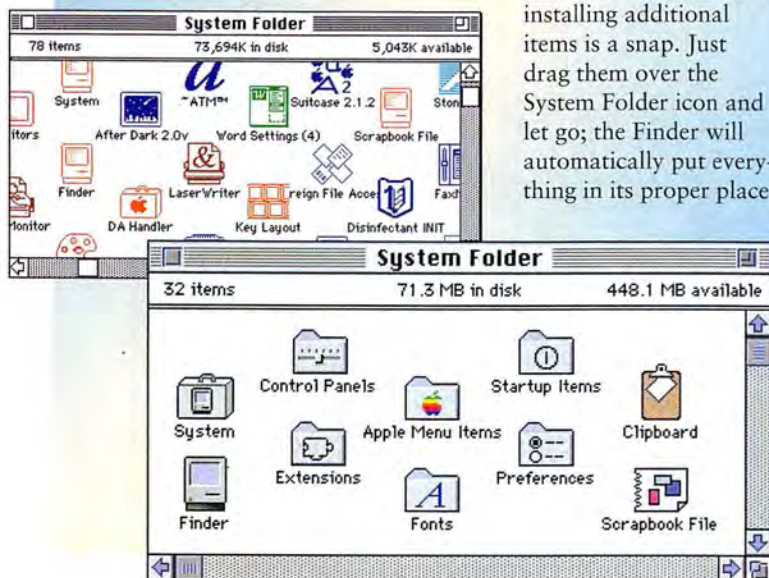
A clever (and practical) use of customized icons: providing previews for your graphics files. Just paste a drawing or painting onto its file icon, and you have an instant visual cue to the file's contents. This is especially handy if your files have names like BizLogo.5 or Flowers-14.

Fast Fact: You can return an icon to its original state by selecting it and using the Clear or Cut (Command-X) command.

17 An Organized System Folder

Under System 6, the System Folder was a chaotic assortment of system files, extensions, control panels, desk accessories, fonts, printer drivers, and preference files. System 7.1 (bottom) eliminates this clutter and confusion by grouping related files into six key folders: Apple Menu Items, Control Panels, Extensions, Fonts, Preferences, and Startup Items. Extensions (INITs) and printer drivers live in the Extensions folder, for example, and application-specific files reside in the Preferences folder.

This new setup makes it easy to find files or examine your extensions list, and installing additional items is a snap. Just drag them over the System Folder icon and let go; the Finder will automatically put everything in its proper place.



18 Office on a Disk

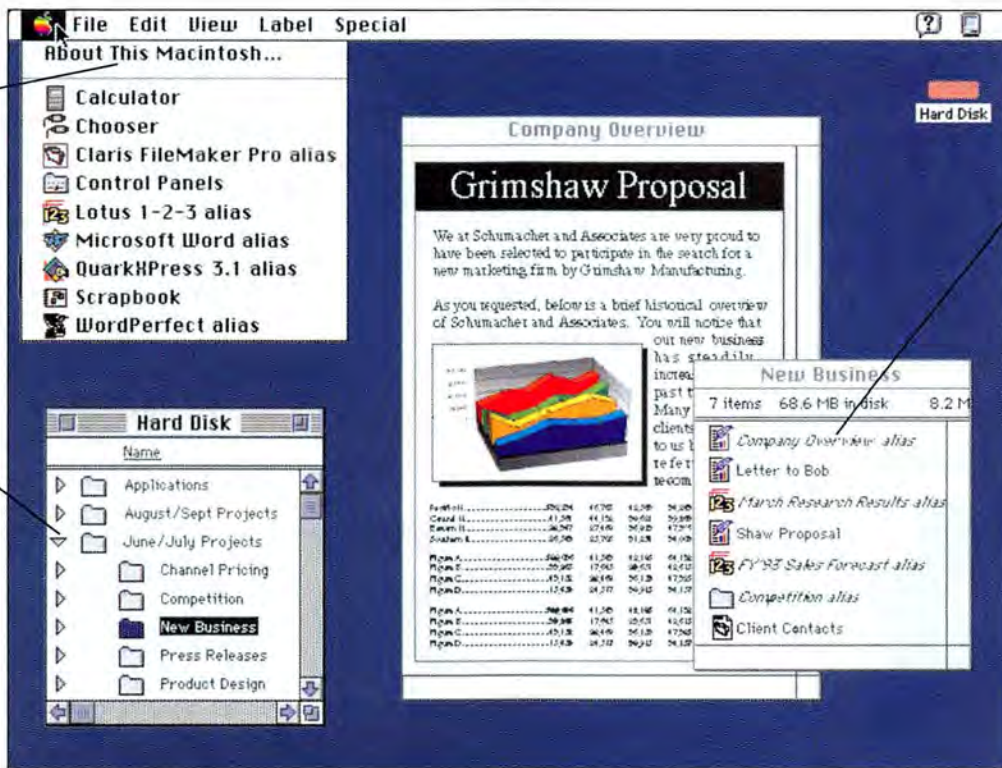
By combining the power of file sharing and aliases, you can easily access your hard disk from any Mac on your network—a great setup if you're collaborating on a project at someone else's desk and need a crucial file.

To do so, use the Sharing command in the Finder to make your hard disk available on the network. Then make an alias of the shared hard disk and copy it to a floppy disk. Walk down the hall and stick the disk in someone else's Mac, double-click the hard-disk alias, and voilà—you're connected to your Mac's hard disk.

Need to retrieve office files from your PowerBook or home computer? If you have a modem at both ends, you can use AppleTalk Remote Access to dial up your work

How to do an honest day's work by using an alias.

The new Apple menu allows you to easily access anything on your Macintosh—files, applications, desk accessories, control panels, whatever—by simply placing it in your Apple Menu Items folder.



The Outline View feature lets you examine files inside a folder without having to open up a new window. Clicking on this triangle creates a drop-down list of that folder's contents.

Creating an alias is a great way to organize your projects so that files and applications can be in several places at once. Click on the "Company Overview" alias here, for example, and you actually open the original file containing your proposal to Grimshaw.

Finding information fast with System 7.

System 7™ software comes with an array of new tools that makes accessing information on your Macintosh™ easier and quicker than ever.

To begin with, you can create an "alias." Designed to help you better organize your hard disk, aliases are not full-fledged copies of files but, rather, small 2K "pointers" to files, folders and applications, which you can put in as many places on your Mac™ as needed. When you click on an alias, you actually open the original—no

matter where it's located.

The new Find feature lets you search for files, folders and applications, and then actually brings them right to the front of your desktop for you.

And with Outline View, simply clicking on the triangle to the left of the folder icon creates a menu list of its contents. So you never fill up your computer screen with multiple windows trying to find that buried file.

Of course, these are just a few of the ways



System 7 can help make you more productive.

They're also just a few of the many reasons why 5 million Macintosh users are now working with System 7, as well as with the more than 6,000 applications available that run on it.

For the name of the Apple® software reseller nearest you, call 1-800-732-3131, ext. 500. Or, if you're a current System 7 user, get the System 7.1 Update Kit by calling 1-800-769-APPLE, ext. 250.

And let System 7 give you the power to find what you have always been looking for. The power to be your best.™



MYTH
System 7 features
are aimed primarily
at networking and
business users, not
individuals.

FACT
Every tip included here
describes a feature
designed to benefit you,
the individual Mac user.

Select these
folders and use the
Sharing command to turn
off file sharing.

19 Saying It with TrueType

Want to make a strong statement
with graphics? Apple's Zeal symbol
font can help you say No Smoking,

computer, then click
the hard-disk alias to
access your files.

Fast Fact: You
can't share your
hard disk if it
contains any
folders that
are already
being
shared.

Select these
folders and use the

No Camping, or just plain No. Sim-
ply press the Shift key and type the
~ (tilde) character. A circle with a
slash through it will appear on top
of the previous character. You can
overstrike any of Zeal's 256 charac-
ters, which in-
clude symbols
for recycling
and recreation,
horoscope signs, arrows that point
in eight directions, and clocks
depicting each hour of the day.

Fast Fact: Typing Option-Shift-
E will place a plain circle on top of
the previous character.

Zeal is one of 43 TrueType
fonts in the Apple Font Pack, a col-
lection of text, display, and symbol
fonts that help you create better-
looking document. TrueType is
Apple's scalable font technology,
which can display crisp, sharp type
at any point size, both on-screen
and on paper.



20 Find Files Faster

Do you prefer reading Read Me files
in Microsoft Word rather than in
TeachText? Or using Photoshop to
open SuperPaint files?

If so, you'll love drag-and-
drop file launching, which lets you
open a document simply by drag-
ging it onto the icon of an appli-
cation (or an alias thereof). If the
program supports the file type, the
icon is highlighted. When you
release the mouse button, it opens
the file.

Drag-and-drop file launching
is simple, elegant, and an incredible
time saver. To maximize its benefits,
arrange aliases of your favorite word-
processing, graphics, and compres-
sion programs on your desktop so you
can open almost any file instantly,

The Future is Here



The foundation for Apple's future oper-
ating-system development is what's
on your desktop today—System 7.
You'll see a wealth of new tech-
nologies from Apple over the next
couple of years, all of which build
on the base of System 7.

Apple plans to release most
of these technologies as modular
extensions to System 7, which means that to gain a new
capability, you'll simply drop an extension into your exist-
ing System Folder. You may already be using some of our
existing extensions, which include QuickTime and Mac-
intosh PC Exchange.

This modular approach to system development
offers several advantages. It enables Apple to bring new
technologies to market faster, because we don't have to
release a new version of the system software. It lets
developers integrate the new capabilities into their appli-
cations more rapidly. And it allows users to adopt the
technologies at their own pace. Every 12 to 18 months,
the available software extensions will be rolled into a new
system release.

How can you get the new extensions? Apple is mak-

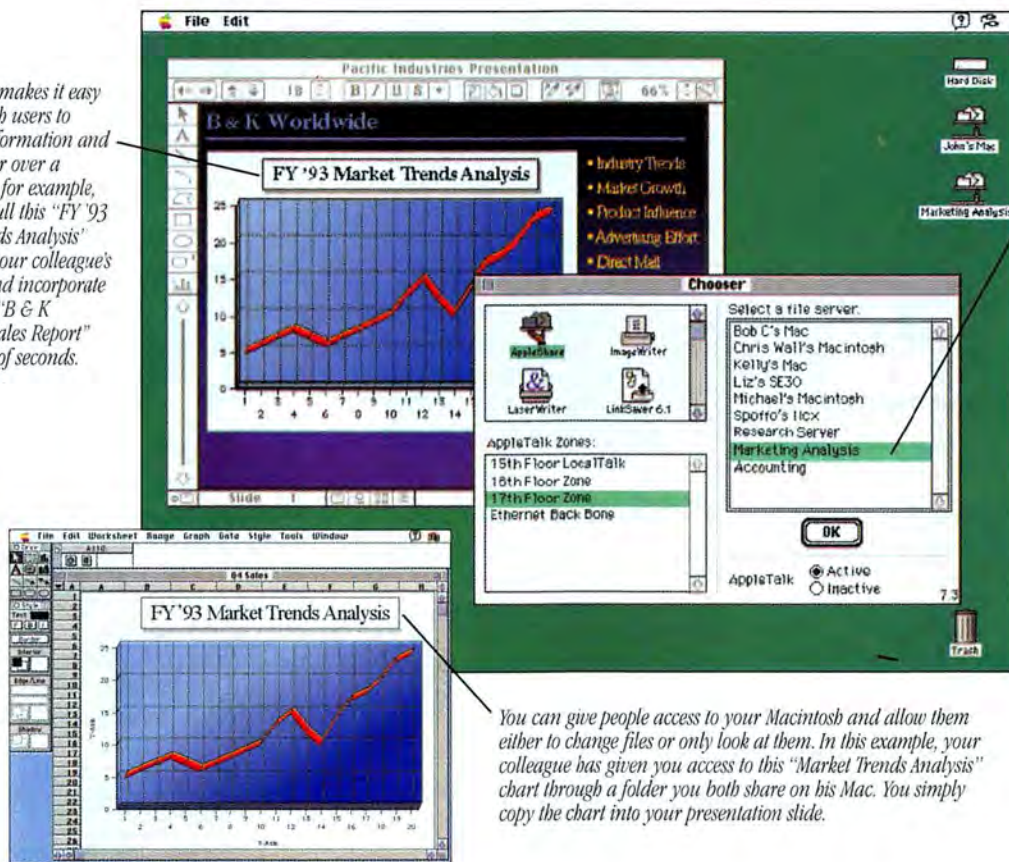
ing them available in a variety of ways. For example, the
QuickTime extension is bundled with many applications.
The extension is part of the QuickTime Starter Kit, which
also contains movie clips and movie-making tools.
Finally, QuickTime is included with the current system
release, System 7.1. Other extensions, such as Macintosh
PC Exchange, are available as separate software packages.

Apple is also using this modular approach to add
support for new Mac models. Instead of releasing an
incremental System 7.x.x with each new CPU, Apple is
now shipping an *enabler* with every machine. This modu-
lar extension makes the new Mac CPU compatible with
the current version of the system software. For example,
the recently introduced Macintosh Centris machines come
with an enabler that allows them to run System 7.1, which
shipped in October 1992. As with other extensions, all
available enablers will be rolled into the next general
release of the system software.

In short, Apple's modular strategy means we can
deliver new capabilities to our user community without
disrupting their existing systems. In the July issue of
MacUser, we'll preview two of the modules in develop-
ment: AppleScript and the Apple Open Collaborative
Environment (AOCE).

How to pull together 3 months of research in under a minute.

File sharing makes it easy for Macintosh users to exchange information and work together over a network. So, for example, you could pull this "FY '93 Market Trends Analysis" chart from your colleague's computer and incorporate it into your "B & K Worldwide Sales Report" in a matter of seconds.



Each Macintosh user determines which files are shared with which people. To access the chart on your colleague's Mac, you simply open the Chooser and select your colleague's file server or desktop computer name. Which, in this case, happens to be "Marketing Analysis."

You can give people access to your Macintosh and allow them either to change files or only look at them. In this example, your colleague has given you access to this "Market Trends Analysis" chart through a folder you both share on his Mac. You simply copy the chart into your presentation slide.

File sharing with System 7.

With System 7™ software and its built-in file sharing, putting together a presentation on your Macintosh® has never been easier or quicker. Even when the research you've gathered for it is in someone else's computer.

Now, despite the fact that you and your colleagues may have different schedules, you can still collaborate on a project over your network. Because file sharing enables you to work with files on each other's computers.

You simply give your associates access to any

designated file or folder on your Macintosh, and they can work with your data from their computers.

So let's say, for instance, that your boss walks into your office and asks to see where you're at with your quarterly research summary. But the June findings happen to be on your vacationing partner's Mac.

No problem. With file sharing, you can access your partner's data in moments.

Of course, this is just one of the many ways



System 7 can help make you more productive.

It's also just one of the many reasons why 5 million Macintosh users are now working with System 7, as well as with the more than 6,000 applications available that run on it.

For the name of the Apple® software reseller nearest you, call 1-800-732-3131, ext. 500. Or, if you're a current System 7 user, get the System 7.1 Update Kit by calling 1-800-769-APPL, ext. 250.

And see how easily System 7 can give you the power to pull your work together fast. The power to be your best.®



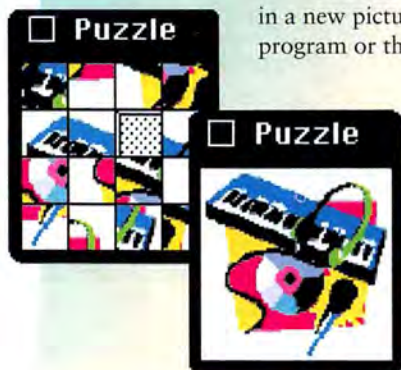
21

Puzzle Fun

Time for a coffee break! Did you know that the System 7 Puzzle DA actually contains two puzzles? Normally, when you open the desk accessory you see a scrambled version of the Apple logo. However, if you select the Clear command (Edit menu) while the Puzzle DA is active, you'll see a second, easier puzzle that uses numbers. To restore the Apple logo, choose Clear again.

You can personalize the Puzzle DA by pasting in a new picture. Just select an image in a graphics program or the Scrapbook and copy it to the Clipboard. Then open the Puzzle DA and choose the Paste command. Try it with your company logo or favorite person's face.

If you want to cheat and see the finished picture, System 7 will accommodate you. Open the Puzzle DA, choose the Copy command, then select Show Clipboard. Ta-da.



even those that display the dreaded "Application can't be found" alert when you double-click them.

22

Help!

Ever feel like you're not using the full power of your applications? What *does* that wand-shaped tool in your graphics program do, anyway?

If the program uses System 7 Balloon Help, you won't have to thumb through a manual to find out. Just move your cursor over the wand-shaped tool's icon, and a balloon will pop up beside it, telling you what the tool is and how to use it.

Balloon Help is a built-in system for teaching you about features of the Macintosh system and software, and it can make your programs easier to learn and use. You

turn Balloon Help on and off through the Help menu located near the right end of the menu bar. When it's on, point to anything on the screen—icon, tool, menu command, part of a window, or dialog-box option—and a pop-up balloon will remind you of its function.

23

Unemptying the Trash

Ever deleted a file by mistake? Then you'll be glad to hear that under System 7, the Trash refuses to throw away its contents—even if you shut down or eject a disk—until you explicitly choose the Empty Trash command.

If you put files from a floppy disk into the Trash and eject the disk, the Trash stops bulging, but



the files haven't been deleted. When you reinsert the disk, the files reappear in the Trash, awaiting your command.

When you do empty the Trash, an alert message will ask whether you're sure this is a wise move. To avoid the warning, hold down the Option key while selecting Empty Trash. (You can also delete locked files this way.) To permanently disable the message, uncheck the box labeled "Warn before emptying" in the Trash's Get Info window.

Fast Fact: You can move the Trash icon anywhere on the desktop and it will stay there, even when you restart the Mac.

24

Color-Coding Your Files

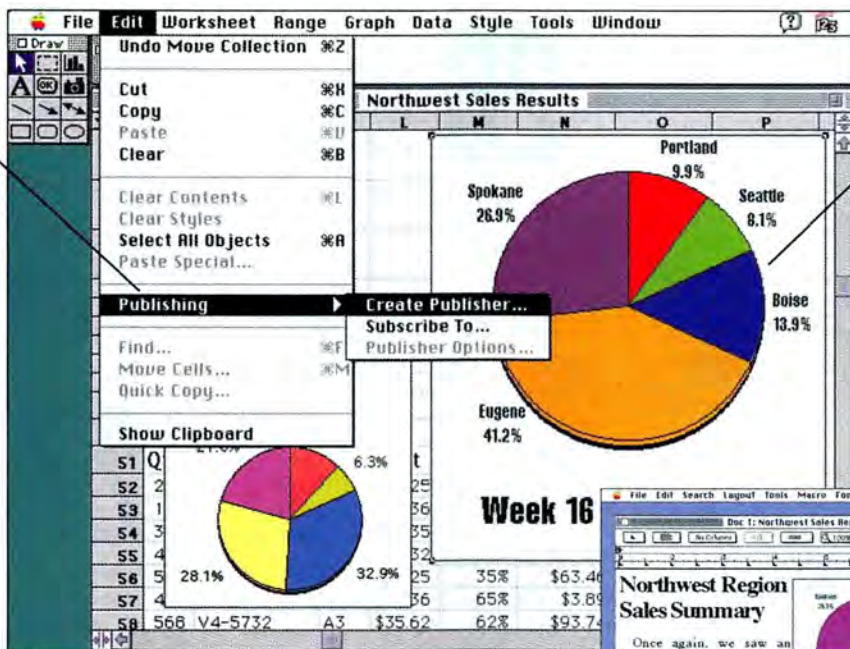
The Label menu provides yet another way to identify and organize your folders, programs, and documents. Replacing the System 6 Color menu, it lets you assign text as well as a color to icons. You can, for example, assign an orange Priority label to all of your critical files. (If your monitor doesn't dis-



The Labels control panel lets you customize the colors and text that can be assigned to file icons.

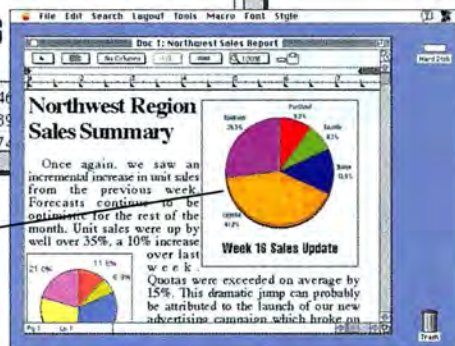
How to make sure your pies are always fresh.

System 7 lets you create "live links" between documents from different applications with a tool called Publish and Subscribe. By "Publishing" a chart from one document, you can "Subscribe To" it and place it in any number of other documents. When you update the original, all the other charts linked to it are updated automatically.



Select the item you want to publish — in this case, a pie chart in your spreadsheet. Go to the Edit menu and choose "Create Publisher." That's all there is to it. Now your chart is ready for you and others to subscribe to.

From your word processing document, select "Subscribe To" in the Edit menu, and you've placed a copy of the chart in your sales summary. When you make changes to the original chart, this new one will be updated automatically to reflect the changes.



Up-to-date documents with System 7.

With System 7™ software and a built-in tool called Publish and Subscribe, keeping reports and documents up to date is as easy as, well, you know what.

For instance, let's say you're working on a sales report in Microsoft Word. Let's also say that you've created a pie chart in a Lotus 1-2-3 spreadsheet showing your company's most recent sales results, and you want to include this chart in your final report.

Experience tells you, however, that these

sales figures will continue to change right up to the very last minute.

No problem. With the Publish and Subscribe feature, you can publish the pie chart from your spreadsheet and then subscribe to it from within your word processing document.

This creates a "live link" between the two. Now, each time you revise the sales figures in your Lotus spreadsheet, the pie chart will automatically reflect the changes. So your final report will always be revised and up to date.



Of course, this is just one of the many ways System 7 can help make you more productive.

It's also just one of the many reasons why 5 million Macintosh® users are now working with System 7, as well as with the more than 6,000 applications available that run on it.

For the name of the Apple® software reseller nearest you, call 1-800-732-3131, ext. 500. Or, if you're a current System 7 user, get the System 7.1 Update Kit by calling 1-800-769-APPL, ext. 250.

And then see how System 7 can give you the power to keep all your ideas fresh. The power to be your best. Apple



MYTH
My applications
won't work with
System 7.

FACT
More than 6,000
applications are fully
compatible with System 7,
including some previous
versions of many
popular programs.

play color, the Label
menu will show only
the label text.)

You can
change the label
colors and asso-
ciated text
through the
Labels
control
panel. To
change a
label color, double-

click it, and the standard
Mac color picker will appear,
allowing you to select another hue.
Change the label text to reflect your
priorities or organizational scheme.

In Finder windows, you can
sort files according to their label
colors, and list views have a column
for text labels. (To view files by
label, you must have the "Show
label" box checked in the Views
control panel.)

✓ 25 Crash Recovery

Under System 6, if your Mac froze
while you were working, you usually
had to restart it, losing all of your
unsaved work in the process. If a
program hangs under System 7,
however, you can usually return
safely to the Finder by typing
Command-Option-Escape. Although
you will lose unsaved
work in the current pro-
gram, this command
gives you a chance to

*System 7 has new
memory-manage-
ment strategies that
greatly increase the
amount of memory
available to applica-
tions. You access
them through the
Memory control
panel.*

save files in other open applications.
After a forced quit, you should close
all programs and restart the Mac
before continuing with your work.

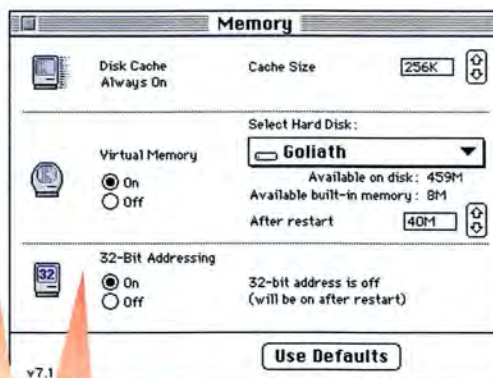
If you run into conflict prob-
lems with your extensions, you can
turn them off by holding down the
Shift key when you turn on or restart
your Mac. To turn the extensions
back on, you must restart the Mac.

26 Never Run Out of Memory

If you work with large files or want
to use several programs at once,
you'll appreciate
the new memory-
management
schemes in System
7, which can in-
crease the amount of memory avail-
able to applications by an order of
magnitude (or more).



Virtual memory lets you use
free hard-disk space as RAM, by-
passing the limits on physical RAM.
If your Mac has 4 megabytes of
RAM installed, you could quadruple
it by having the Mac use 12 mega-
bytes of your hard disk as virtual
memory. You tell the Mac how much
disk space to allocate as virtual mem-
ory through the Memory control
panel. Virtual memory is slower than
real RAM, but it can be invaluable
if you do a lot of number crunching



or work with memory-hogging
graphics, animations, or sounds.

On most Mac models, you need
to switch on *32-bit addressing* (via
the Memory control panel) to access
more than 8 megabytes of physical
RAM or more than 12 megabytes of
virtual memory. If you handle 50-
megabyte color images in Photoshop
or QuarkXPress, take note: 32-bit
addressing lets you install up to 128
megabytes of physical RAM and
access up to 1 *gigabyte* of virtual
memory.

Virtual memory and 32-bit
addressing aren't supported by some
older Mac models. However, Apple
has released the 32-bit System
Enabler, a software extension that
brings 32-bit addressing capabilities
to the Mac II, IIx, IICx, and SE/30.
It's available from many on-line ser-
vices and electronic bulletin boards.

27 More Alias Ideas

The range of uses for aliases is end-
less. Here's a sampling of the ways
they can help you work faster and
smarter:

Put an alias of the Apple Menu
Items folder on your desktop. Any-
thing you drop into the alias will
be automatically placed in the real
folder (inside your System Folder)
and will be immediately available on
the Apple menu. Double-clicking the
alias will open the original folder.

Place aliases of essential pro-
grams in the Startup Items folder.
Whenever you turn on the Mac, they
will open automatically.

Make an alias of your net-
work's file server or a shared folder
from someone else's Mac. Double-
clicking the alias will automatically
mount the server or folder; if a pass-
word is required, the AppleShare
log-on dialog box will appear.

Use aliases to locate files you've
archived on floppy disks. Double-

Making the Move to System 7



Still running System 6.x software? Upgrading to System 7 is easier than you may think. And once you discover how much more productive you are under System 7, you'll be glad you made the move. Here are answers to some commonly asked questions about switching to System 7.

- System 7.1 is the current version of the Macintosh system software. Released in October 1992, System 7.1 is shipped with all Macintosh CPUs worldwide.

- System 7.1 requires a hard disk, and we recommend 4 megabytes of RAM. System 7.1 is shipped on 1.4-megabyte floppy disks, but if you don't have a SuperDrive, you can exchange the high-density disks for 800K disks by calling Apple at 800-769-APPL.

- The System 7.1 Personal Upgrade Kit (\$99, suggested retail price) is available from many mail-order and retail outlets. For the reseller nearest you, call 800-731-3131, Ext. 500.

- Installing System 7.1 requires just one click of the mouse; the Installer program does the rest. In addition to placing the System 7.1 files in their correct locations on your hard disk, the Installer deletes outdated system files and moves third-party extensions, control panels, and fonts into the appropriate folders.

- Boot your Mac from the System 7.1 Install disk before performing the installation. If you want to run the

Installer from your hard disk, turn off your extensions (INITs) first. You don't have to remove your applications prior to installing System 7.1.

- Before installing System 7.1, run Compatibility Checker 2.0, which is included in the Personal Upgrade Kit. This diagnostic tool analyzes your extensions, control panels, and applications, flagging those that should be upgraded. It can automatically move incompatible extensions to a special folder, allowing you to run System 7.1 without mishap. Compatibility Checker is also available free of charge from various on-line services and Mac user groups.

If You Already Use System 7.0...

Users of System 7.0 and 7.0.1 can move to System 7.1 by ordering the System 7.1 Update Kit directly from Apple for the special price of \$34.95, plus shipping and handling. Call 800-769-APPL, ext. 250.

System 7.1 is a minor update. You should get it if you want the enhancements listed below or haven't acquired the System 7 Tune-Up, which fixed problems with disappearing folders and printing in low-memory situations.

What's new in the System 7.1 update? The Fonts folder provides easy installation and centralized storage of TrueType, PostScript, and bit-mapped fonts, and file sharing has improved security settings. Tune-Up has been integrated into the system software, and the QuickTime 1.5 extension is included with the update. Last but not least, you get one year of toll-free phone support.

click the alias, and the Mac will ask you to insert the appropriate disk. (You *did* name and label the disks, didn't you?)

You can even make aliases for files you've copied to PC-formatted disks with Macintosh PC Exchange.

28 Making Movie Selections

The standard way to select a portion of a QuickTime movie is to hold down the Shift key and drag the play

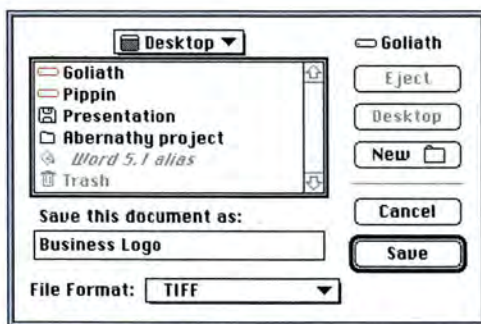
bar. But did you know you can also select portions of a movie while it plays? Position the play bar at the start of the section you want to select, hold down the Shift key, and hit either the space bar or Return key. The movie will begin to play, selecting the played portion as it goes. When you release the Shift key, it will stop playing and the played portion will be selected.

Fast Fact: Double-clicking a movie image will play it; a single click pauses playback; and Shift-double-clicking plays the movie backward.



29 Speedy Saves and Opens

Because you probably spend a lot of time in Open and Save dialog boxes, System 7 offers new shortcuts to streamline your filing chores. The Desktop button, which replaces System 6's Drive button, lets you see and access everything on the Finder desktop, including disks, files, and folders. Now you can quickly select a particular disk or folder instead of repeatedly clicking the Drive button to switch between the available drives.



Under System 7, the *Save As* dialog box has a *Desktop* button that lets you see and access everything on the desktop, including files, folders, and disks.

You can also use keyboard shortcuts for almost any task. The up- and down-arrow keys move you through a list; the ``` (accent) key takes you to the bottom of the list. Type the first character(s) of a filename or disk to

select it. In the *Save* dialog, the *Tab* key toggles between the filename field and the scrolling list of files.

To reach the desktop level using the keyboard, type *Command-D*. *Command-right-arrow* and *Command-left-arrow* cycle through the desktop's folders and disks. *Command-down-arrow* takes you into a selected folder; *Command-up-arrow* moves you up one folder level.

30 Checking for Viruses

Under System 7, Aladdin Systems' popular compression utility, *StuffIt Deluxe 3.0*, can check files for viruses as they're being decompressed.

StuffIt Deluxe uses System 7 Apple Events to open a specified virus-detection program and instruct it to scan the newly uncompressed files for viruses. If a virus is discovered, the program warns you not to use the file.



To set up a link between *StuffIt Deluxe* and a virus-detection program, such as Symantec's *SAM 3.5*, click the checkbox labeled "Detect viruses with..." in the Preferences dialog box. Then use the *Select* button to locate the program. (The chosen virus-detection program must also support System 7 Apple Events.) From now on, all *StuffIt Deluxe* files will automatically be checked for viruses whenever they are decompressed.

Take Off With System 7

Apple wants every Macintosh user to experience the power unleashed by our award-winning System 7 software. So from March 15 through June 30, if you purchase System 7 and one of more than 50 qualifying Mac applications, you'll receive a rebate of \$5 to \$20 on the application software. This offer is available from the companies shown below.

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800-255-6227

Waldensoftware

800-443-7359

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800-451-7631

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800-248-0800



800-826-3928

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800-EGGHEAD

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To order system software from the Apple Catalog, call 800-795-1000 (24 hours a day, 7 days a week). International readers can reach Apple by calling 408-996-1010.



CONTENT: AILEEN ABERNATHY DESIGN: KATHY MARTY ILLUSTRATIONS: PETER HOEY

TO VIRUSES IT'S LIKE A IN FRONT OF AN ELECTRIFIED AND, TOTALLY SURROUNDED BY A MOAT FULL OF.

**New SAM 3.5. There's
 nothing tougher on viruses.
 And easier on you.**

In the war on viruses, it's all or nothing. So get new SAM 3.5, the toughest, most comprehensive virus stopper out there. And the easiest.

New To SAM 3.5

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- Easy color interface
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Because it stands silent watch in the background; scanning your files, floppies, and appli-

cations round-the-clock to stomp out attacks before they begin. And it helps you quickly repair infected files.

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The toughest SAM yet.

New SAM 3.5 is the toughest barrier against unknown viruses you can buy. It's the only antivirus that

scans and detects viruses in compressed files. And the only one that lets you schedule scans in advance. Plus, it's now easy to install and distribute over networks.†

With new SAM 3.5 you've got nothing to fear. And everything to gain, in productive worry-free computing. For just \$99*. SAM owners can upgrade for just \$24** by calling 1-800-343-4714, ext. AF15.



*Price in U.S. dollars. Dealer price is suggested. Actual price may vary. **Offer price in U.S. dollars, valid in U.S. and Canada only. SAM is a registered trademark of Symantec Corporation. In Canada, call 1-800-465-2266. Everywhere else, call 408-252-3570. † Available for volume purchasers, and with the SAM 3.5 10-pack version. Call 1-800-554-4403 for more information via FAX. Select option #2 and request document #4510. © 1992 Symantec Corporation.

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Armchair Headhunting



**Grab a copy of
The Wall Street
Journal or People,
and you too can
join in on the fun
of armchair
headhunting,
as we pick
John Sculley's
successor.**

There's a new game sweeping Silicon Valley: armchair headhunting. For those who'd like to join in on the fun, the rules are easy. First, the shareholders in a big company get fed up with quarter after quarter of mediocre results. Next, the board of directors gets pressured to give the CEO the heave-ho. Then the press gets together to pick a replacement candidate for the hot seat, and the bets are placed. Finally, the sage advice of the punditocracy is ignored, an unknown replacement is selected, and the next round of play starts up.

The hottest game today centers around IBM and its outgoing CEO, John Akers. But advanced players of armchair headhunting are already betting on the subsequent round of play: Who replaces the person who replaces John Akers?

With John Sculley high on everybody's short list of candidates for Akers' spot, the real question is: Who would replace Sculley at Apple?

Chances are that whenever Sculley decides to go, his replacement will come from inside. But for you long-shot players, here's the current list of outside candidates for the top spot at Apple, along with their biggest pluses and minuses and the odds on their getting the nod.

Lee Iacocca

Long-shot Iacocca could deliver a shot in the arm with an "If you can find a better computer, buy it!" testimonial ad campaign, featuring him rolling up his shirtsleeves to personally test how each new Mac fares in a rigorous crash test.

Biggest plus: His hard-hitting style would reinvigorate Apple sales and marketing.

Biggest minus: Apple execs will balk if Lee decrees that the official corporate wheels will now be the K-Car.

Odds: 20-to-1.

Akio Morita

As the head of Sony, one of Apple's biggest suppliers, Morita is already intimately familiar with the Mac product line.

Biggest plus: Sony's vise grip on the consumer-electronics distribution channels would help move Performas and Newtons into the market.

Biggest minus: Insistence on making QuickTime compatible with Beta.

Odds: 20-to-1.

Steve Jobs

Is the time ripe for the return of the native? Jobs built Apple from rags to riches, and it was Jobs' gut instincts and his commitment to such projects as the first Mac and the LaserWriter that saved Apple from the brink of oblivion more than once. Many credit his charismatic zeal as the primary reason a generation of computer users were willing to gamble on the unproved, underpowered, overpriced Mac platform.

But in his NeXT turn at bat, that zeal turned to stubbornness, as Jobs' refusal to accept the reality that NeXT's real strength was software left NeXT awash in a sea of red ink amid a tide of outgoing employees.

That finally changed earlier this year, when NeXT announced that it would no longer sell hardware and would focus on its operating system and application-development environment. The question is, Was that move merely Jobs' finally coming to grips with market realities or was he intentionally decapitating the company as a prelude to a new détente with Apple?

Biggest plus: Jobs' newfound expertise in the workstation- and IBM-dominated enterprise realms would be a boon as Apple poises to launch its forthcoming line of PowerPC-based machines.

Biggest minus: Remember the Apple III? Didn't think so.

Odds: 30-to-1.

George Bush

He's available and has no preconceptions about which computers are best — or even about what they do — that might bog him down.

Biggest plus: Read my lips — no new PDS/expansion-slot form factors.

Biggest minus: Thinks System 4.2 is "pretty high-tech."

Odds: 50-to-1.

Siskel and Ebert

The duo that gave new meaning to the phrase "opposable thumbs" would jointly share the chief executive's office. Siskel (the tall, skinny one) is a notorious PC guy and would focus on the serious IBM joint-venture projects, such as PowerPC, Taligent, and Kaleida. Ebert (the less tall, less skinny one) is the Mac guy and would focus on the cute, cuddly machines, such as the Color Classic and the Newton.

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CIRCLE 62 ON READER SERVICE CARD.

JON ZILBER

Biggest plus: Apple would benefit from the vigorous dialogue between the two, with neither one of them willing to let the other's utterly ludicrous viewpoint go unchallenged.

Biggest minus: We'd be stuck with Gene Shalit's movie reviews.

Odds: 100-to-1.

Roger Heinen

The former guru of the Mac OS recently defected to Microsoft to head up database operations. Some speculate that the whole affair was a ruse to give him access (no pun intended) to the secrets of the inner circle at Microsoft before returning to Cupertino.

Biggest plus: Still has his key to the executive washroom.

Odds: 150-to-1.

John C. Dvorak

MacUser's own anti-editor would bring a much-needed dose of reality to Cupertino.

Biggest minus: Would insist on writing the back page of all Apple manuals.

Odds: 150-to-1.

Rush Limbaugh

The infamous right-wing talk-show host may hold the distinction of being the only radio/TV personality who has discussed PowerBooks and "environmentalist wackos" on the air in the same breath.

Biggest plus: He commands the unswerving devotion of millions of dedicated followers.

Biggest minus: Apple productivity would plummet when he removed Jolt from the programmers' vending machines and replaced it with Snapple.

Odds: 200-to-1.

Barney, the Dinosaur

Big Blue gets trounced by Big Purple? The latest idol of the preschool set would have a field day restoring Apple's lead in education.

Biggest minus: Well, he's a fictional character.

Biggest plus: He's a fictional character.

Odds: 500-to-1.

Al Gore

Already showing signs of frustration at playing second banana, the vice-president would bring valuable Washington connections to the job.

Biggest plus: Technological literacy.

Biggest minus: Tipper would demand warning labels on any software that featured hidden and potentially mind-warping "Easter egg" messages in its About box.

Odds: 500-to-1.

Zoë Baird

Although her nomination as U.S. Attorney General stumbled over the nanny thing, she entered the spotlight as an intelligent and competent administrator and litigator.

Biggest plus: By personally overseeing Apple's legal efforts, she could dramatically turn the jurisprudential tides in Apple's favor in numerous strategically important arenas.

Biggest minus: Potential scandal about whether she ever actually paid her shareware fees.

Odds: 500-to-1.

Bill Gates

The man who has everything — except a computer company — may just go for the chance to prove he's got what it takes to sell hardware.

Biggest plus: Rebates! Rebates! Rebates!

Biggest minus: Nifty plans for system extensions include the C: prompt, AUTOEXEC.BAT files, and whatever idea he last overheard an indiscreet third-party vendor talking about.

Odds: 1,000-to-1.

Sinatra

As Apple's Chairman of the Board, ol' Blue Eyes would use that patented melodic mix of boyish charm and veiled threat to preempt any possible defections among Mac users considering a switch to Windows.

Biggest plus: New corporate slogan: "The power to be your best, Jack!"


Biggest minus: Aging Rat Pack performs at annual shareholders' meetings.

Odds: A long shot, but would you really want to bet against him?

John Akers

As the outgoing head of IBM, the anything-but-green Akers knows exactly where the enemy's greatest weaknesses are.

Biggest minus: Where do you think the enemy's greatest weaknesses came from?

Whenever he goes, and whoever gets the job, Sculley will be leaving some big shoes to fill. So you'd better not leave Michael Jordan off your list. 

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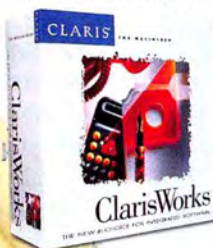
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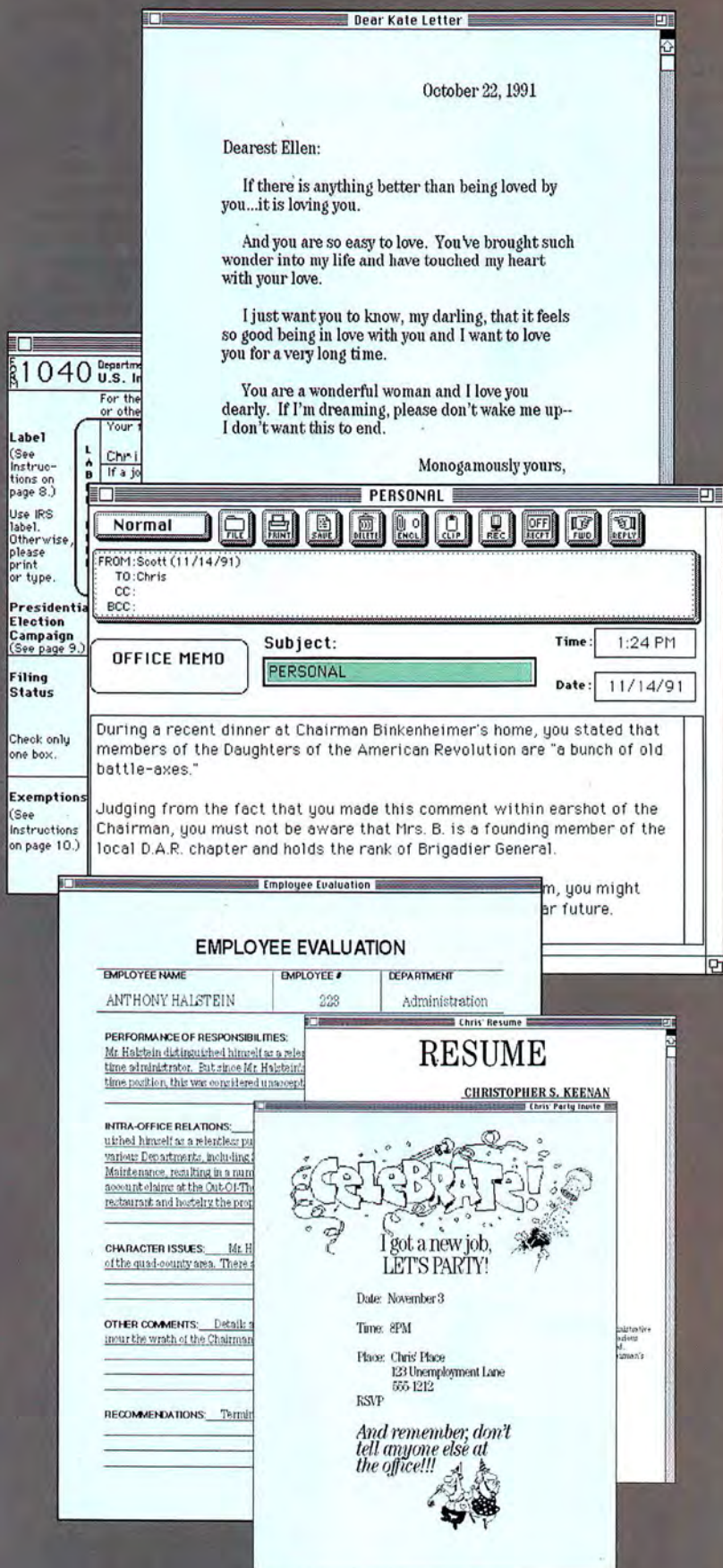
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FIFTH GENERATION SYSTEMS, INC.

CIRCLE 106 ON READER SERVICE CARD.



To Your Credit



Putting that new hard drive or word processor on your credit card is already easy. Here's how to make it safe.

If you've lived a good, clean life (or if you haven't and God has consistently been looking the other way), the concept of ordering your bank to refuse payment on a credit-card transaction is something you've only read about in consumer columns. Yes, the whole concept gives you a warm, fuzzy feeling when you place an order; if merchants try any funny business, you know that your own horde of Terminators will be at the credit-card company awaiting your command to yank that payment authorization out from under the merchants' very feet, leaving them blinking and sputtering.

Of course, right about now, those readers who have been through the experience are probably doing a little sputtering of their own, because it just ain't that simple. See, the credit-card company isn't Prince Valiant, it's merely Judge Wapner. Legally, the credit-card folks cannot simply refuse payment to the merchant; in general, they act as arbitrators for your disagreement. If you try to refuse payment, they will immediately *suspend* the payment, usually for a period of 30 to 90 days, while they contact the merchant with whom you have the dispute. If the merchant responds in a timely manner with a Darn Good Explanation, your friendly credit-card company will reactivate the payment and you'll have the option of either paying up or patiently explaining that the merchant is still full of beans.

So, before you try playing the refuse-payment card, keep in mind some important caveats: First, if you actually have the merchandise in your hands in working order at the agreed-upon price, you will almost certainly lose in the arbitration. It doesn't really matter if the merchandise arrived late or if the salesperson laughed at your cheap hair weave or if the goods arrived broken and the merchant replaced them. Second, go to Niffelheim and back to try and work the problem out with the merchant directly before you cry to the credit-card people. Frankly, it'll probably result in a speedier and more amicable resolution, and even if it doesn't, it'll put you in good with the credit-card company when it's time to arbitrate.

The victory usually goes to the party that has the most documentation, so start working on your pile the minute you step into the store or pick up the phone to place an order. Make a note of the names of everyone you talk to and when, and have the merchant list

specifically what the items are; if the salespeople are promising you a Quantum drive, a Trinitron monitor, and Samsung memory chips, make sure they write it all down on the invoice. Ditto for their specific promises of warranty service and customer satisfaction. If you're conducting your business by phone, hey, it's a tough world out there, so go spend ten bucks for a gizmo that allows you to tape your phone conversations. It's a little creepy, sure, and unless you want to break the law, you'd better inform the merchant right off the top that you're recording the conversation, but it has many advantages. Obviously, it's good to have evidence of a broken promise, but taping your conversation can also save you the embarrassment of finding out late in the game that the whole problem was based on your own dopey misunderstanding.

The last comforting piece of info I'll pass along is that Your Mileage May Vary. With bank-issued credit cards such as MasterCard or VISA, the central company really doesn't get involved in consumer complaints; arbitration is left up to the bank that issued you the card. As you might guess, larger and more powerful banks are, by most reports, more apt to give consumers the benefit of the doubt than are smaller ones. If you have a particularly hairy experience with a merchant, though, send a complaint to the central card company anyway. It won't help you one bit, but mass quantities of customer complaints may help tip the scales against the merchant when it tries to continue its relationship with the credit-card company.

Debit Ain't Credit

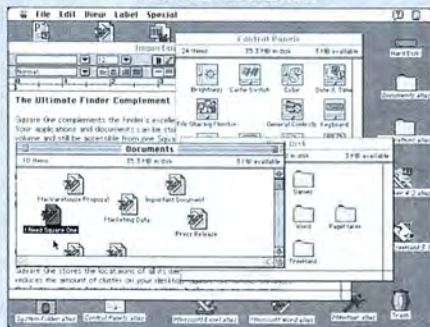
Using a debit card is a cool demonstration of powerful computing accomplished through simple means. As far as a merchant is concerned, a debit card is a national credit card (usually a MasterCard) that the merchant gladly accepts for payment. As far as your bank is concerned, though, a debit card is a checkbook. When you "charge" an item on your debit card, a "check" of sorts is automatically written and funds are automatically transmitted from your bank account to the merchant's.

But don't make the possibly fatal mistake of looking at that MasterCard logo and assuming that purchases made with the debit card will come resplendent with all the safeguards and securities MasterCard offers. It's

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ANDY IHNATKO

entirely possible that your bank will indeed treat the card like a checkbook and that the niceties normally associated with bank credit cards — purchase protection; warranty extension; and most important, the ability to refuse a payment or limit your loss liability should the card be lost or stolen — may be severely reduced or even nonexistent.

Be sure to treat a debit card like a very convenient checkbook with no more protection than that normally associated with writing checks. Individual protection is generally up to the bank issuing the debit card. My own debit card happens to have just about all the privileges and protections of a "real" MasterCard, but this is only because my bank contracts such protection from an insurance company in Texas. So it's pretty important to contact your bank and get a complete list of protections and liabilities in writing before you rely implicitly on a debit card. Large purchases and all mail-order purchases are best left to a "real" credit card, with which safety guarantees may be less ambiguous.

The Numbers Game

Many people have asked this Zen-like question: "If there are only 5,000,000,000 people on the planet and many of them have lousy credit reports to begin with, then why do we need credit-card-account numbers with 16 digits?" Well, partly because it makes the numbers more difficult to guess, but mostly because only some of the digits identify you specifically. The first 6 identify the company that issued you the card, the next 4 identify where you got the card (a specific branch office of a bank, for instance), and the 5 digits after that identify you. The last digit is just a check digit, for verifying the number's validity.

It's fun trivia, sure, but it's also another reason to be *exceptionally* cautious when asked to reveal *any* portion of your credit-card number. Anyone with a knowledge of the biggest banks in a particular area has a good shot at guessing your entire credit-card number, given just a few select digits.

Late Shipping

There's a highly effective way to cut down on shipping delays when you're buying big-ticket items by mail-order and paying with a credit card: Place your order early in the week, and request a weekday delivery. No kidding. See, a


common scam for folks using stolen credit-card numbers is to order merchandise and have it delivered on a Saturday to a bogus address; delivery people well-nursed on Norman Rockwell Americana often just hand over a \$2,000 package to someone lounging in a front yard or on a stoop, so many of the larger mail-order merchants sometimes delay a delivery by a few days to avoid possibly having to eat the cost of some stolen merchandise. Strange, but true.

Radio Rip-offs

You've got a cordless or cellular phone, right? OK, look at that antennalike object sticking out of it: It's an *antenna*! What did you *think* it was? So anything you say on these phones is being *broadcast* to anyone who cares to listen in with nothing more than a police scanner available at any Radio Shack. I'm a scanner buff myself, and I don't want to cause paranoia here, but for the love of Mike, if you're about to place a credit-card order over the phone, use a regular, corded phone. The criminal element has been known to leave a scanner running all day connected to a voice-activated tape recorder and then invest a mere half-hour at the end of the day to check the tape for credit-card numbers.

Parting Shots

I got lots of responses to my February column, which had to do with Apple's use of nondisclosure agreements and mail-order-software companies' charging hefty fees for product placements in their ads and catalogs. On the plus side, I heard from several people who related similar horror stories regarding Apple's refusal to fix defective hardware under warranty unless the owners agreed not to tell anyone about the problems they had experienced; clearly this is a card Apple has played and continues to play regularly. Additional investigations are under way.

Although response to the info about paid ads was largely positive, there were a few comments that implied that anyone who didn't already know about this practice was obviously one lemon fork shy of a complete place setting. Well, I disagree, and although I don't see such practices as deserving an emblem of shame in the marketplace, I still wonder why those companies don't hide a simple one-line disclaimer somewhere in the small print of their ads and catalogs. 



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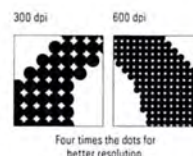
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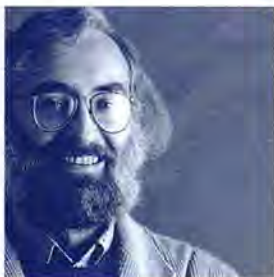
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4M

The Washington Way



According to President Clinton, the United States government needs to start working more like Apple Computer.

When Bill Clinton wanted to unveil his technology policy, he didn't go to Boston or Austin; he went to Silicon Valley. The influence of Silicon Valley executives on the president of the United States is the subject of much discussion, particularly in Silicon Valley. And one Silicon Valley company more than any other seems to have the Clinton ear: Apple Computer.

There are the outward tokens, such as John Sculley sitting next to Hillary Rodham Clinton during the president's address to Congress on the administration's economic plan. There are the objective facts, such as longtime Apple board member John Rollwagen's departure to accept the nomination to be deputy secretary of commerce. The FOB (Friend of Bill) factor is high in Cupertino. So just what message is the president getting from his friends at Apple?

Some answers came out during that Silicon Valley visit in late February. At least, the broad outline of a Clinton technology policy came out. It was left to Vice President Gore, though, to talk about that technology policy.

The Clinton technology policy may or may not reflect Apple influence, but it has features Apple must like. Technology Extension centers, reminiscent of the Agricultural Extension offices established in the '40s, would aid in training and evangelizing potential customers for high-tech products. Apple must love that.

And John Sculley is on record as supporting the data-highway initiative of the technology program, which would encourage the opening of the Internet network to schools and hospitals. The Internet is a kind of supranational supernet of computers mainly at government sites and colleges, originally chartered by the Department of Defense but now a vast, surprisingly open, repository of information and channel of communication. Apple has some ideas about where it fits into the data-highway plan.

What the president seemed to want to talk about at that Silicon Valley news conference, though, was reshaping government. Many presidents have maintained that government should work more like a business. Clinton is the first to say that government should work more like Apple Computer.

"I think government ought to work more like you do," he said, and although he was talking to Silicon Graphics employees, he could just as easily have been talking to the

minions of Macdom. He talked about modernizing government in two ways: through technology and through organization.

"When we took office," he said, "I walked into the Oval Office, [which is] supposed to be the nerve center of the United States, and we found Jimmy Carter's telephone system. No speakerphones, no conference calls, but anybody in the office could punch the lighted button and listen to the president talk. So I could have the conference call I didn't want but not the one I did.

"Then we went down into the basement, where we found Lyndon Johnson's switchboard. [T]here were four operators working from early morning to late at night. When a [call] would come in and [the caller would] say, 'I want to talk to the vice president's office,' they'd pick up a little cord and push it into a little hole. *Today.*"

The point of the story is pretty obvious. Governing, a task whose essence is communication, is going to be less efficient than it might be, if it is forced to use antiquated communications technology.

As a pitch for a new telephone system for the White House, this story is pretty effective, but it probably doesn't scale up well. Improving efficiency through investment in technology doesn't fly in my house in these belt-tightened times, and it wouldn't get through Congress. I don't think that Clinton really intends to replace all of the government's phone systems.

In fact, it's not all that clear how the president would use technology to change the way government works. When one Silicon Graphics employee hopefully suggested using high-end presentation and visualization technology to communicate the complexities of the national budget or the president's economic plan to the American people, Clinton was polite but not obviously convinced. After all, Perot got awfully good ratings with those cheap flip charts.

Perot and Clinton each think they invented national town meetings. Perhaps this is where technology can change the way government works. But the possibilities here may be in grass-roots efforts rather than in any actions the president can take. Technology could provide a forum in which citizens could debate public issues, maybe on that data highway, and those who have spent any amount of time on-line know that the medium has a way of masking irrelevant factors such as

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the race or gender of the participants. Judging by callers to C-SPAN, though, I'd say we Americans have a long way to go before we can debate public issues rationally. Well, maybe we're just out of practice.

What the president really wanted to talk about, it seemed, was not technology but a different approach to decision making. What we need in government, he stated, is to "modernize decision making. Technology is part of that, but so is organization and empowerment, which is something that you've taught us again today."

"Again" was apt. The Silicon Graphics folks had given the president a lecture on how to run a high-tech company, but it was a lesson he had surely heard before — from his friend John Sculley, for example.

Silicon Graphics is successful, the presentation went, because of the way it does business. Informality, consensus decision making, egalitarian organizational structure, open work-space plans, small workgroups, opportunities for all employees to contribute significantly, and the flexibility of a startup company.

In other words, the Macintosh Way.

Why do I give Apple credit for this model of doing business? Silicon Graphics and many other high-tech companies have such policies. And Apple didn't invent them; the original impetus for this approach at Apple was Steve Wozniak's desire that Apple should be run like his favorite company, Hewlett-Packard. Back then, they called it the HP Way.

Not only that, but Apple has been redefining itself lately, and who knows how much of the Macintosh Way will survive this redefinition? But, of course, redefining itself, as much as the Macintosh Way, is what Apple does. So maybe it's just chaos as usual in Cupertino.

In any case, Apple deserves credit for the spread of the Macintosh Way for this reason: Apple gambled high on this radical management style, evangelized for it, insisted loudly that this was the new way to do business — the better way — and that it was the secret of Apple's success. If Apple had not succeeded as well as it has, if Apple were not today the leading manufacturer of personal computers in the world, how many high-tech

companies would be following its example? Apple proved the wisdom of the Macintosh Way by succeeding and would have convinced many of its foolishness if it had failed.

Candidate Clinton already knew about diffuse decision making and employee empowerment last year. "We ran an organization in the presidential campaign that was very much like this," he explained to the Silicon Graphics employees.

"Most decisions were made in a great big room in morning meetings that we had our senior staff in but [where] any twenty-year-old volunteer who had a good idea could walk right in and say, 'Here's my idea.' And some of them were very good ideas, and we incorporated them." Clinton quoted

one expert on high-performance organizations who worked on the campaign. Regarding the campaign organization, the expert said, "It has no organizational chart. I can't figure out what it looks like on paper, but it works."

It did, didn't it? That organization achieved its goal of getting its candidate elected president, and analysts of all political stripes generally agree that it did so brilliantly.

The president had another example. "The vice president was making fun of me when we were getting ready for the speech [the president's address to Congress on his economic plan]. People were running in and out, saying, 'Put this in, take this out.' But it worked."

And it did, didn't it? Whatever one thinks of the economic plan itself, it was a successful speech. Analysts considered it one of Bill Clinton's best speeches ever, and the public gave it an 80-percent approval rating.

Perhaps Bill Clinton didn't need John Sculley to tell him about the Macintosh Way. Perhaps Apple's success with the Way was why Sculley got the seat he did for the address to Congress.

Personally, I don't know if the government of the United States can or should be run like Apple Computer or to what extent Bill Clinton will try or will succeed. But try he will. The subtext of those anecdotes about the campaign team and speech writing was clear: President Clinton is an evangelist for the Way. ☐

**Clinton was polite
but not convinced.**

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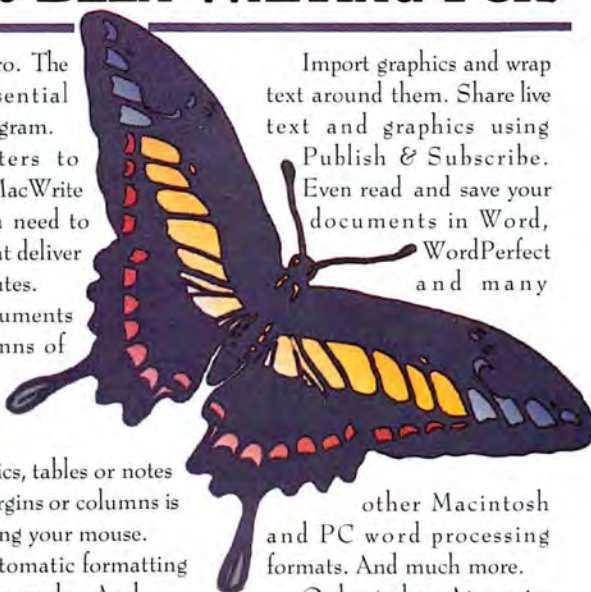
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NO	YES Saves NuBus Slots For Other Boards
NO	YES Compatible With All Video Cards
NO	YES Supports Non-NuBus Macs
NO	YES Compatible With All QuickDraw Accelerators
NO	YES Optional 128K Cache For More Speed
NO	YES Compatible With Apple Virtual Memory
NO	YES Low Cost, No Penalty Upgrades
NO	YES Compatible With Apple A/ROSE Cards
NO	YES Does Not Require Additional Memory
NO	YES Compatible With Apple QuickTime
NO	YES Free Storm PicturePress 2.5 Software
NO	YES Compatible With AppleTalk Remote Access
NO	YES Full AppleTalk/EtherTalk Network Support
NO	YES Compatible With Apple MIDI
NO	YES Full-Color Installation/User Manuals
NO	YES Compatible With All Sound Applications
NO	YES 3 Year Warranty & Toll-Free Tech Support
NO	YES Compatible With All Scanners
NO	YES Compatible With Apple's "Installer" Application
90	0* Total Number of Compatibility Problems

*As on the Macintosh Quadra, using the Apple GC Video Card requires the user to turn off 68040 data caching. 100% compatible with System 6 and System 7 (A/UX not supported).
† A/ROSE- Apple Real Time Operating System Environment, includes Apple Coax/Twinax Card, Ethernet NB Card, MacAPPC, MACDFT, MCP Card, Serial NB Card, SNA/PS, TokenTalk NB Card



The Turbo 040 has a built in math chip and is available in two speeds - 25 MHz (Quadra 700 speeds) and 33 MHz (Quadra 950 speeds). Like the Quadra, the Turbo 040 also has an optional 128K cache card to squeeze out every bit of performance.

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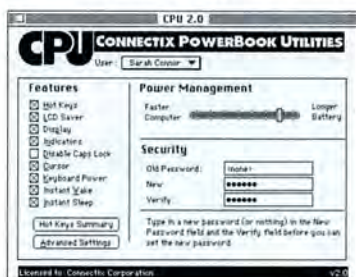
CIRCLE 159 ON READER SERVICE CARD.





Even as we were putting the finishing touches on Sharon Zardetto Aker's article on PowerBook utilities, we got word of two updates and another file-synchronization package.

CPU (Connectix PowerBook Utilities) 2.0



(\$99), from Connectix (800-950-5858 or 415-571-5100), adds several features to the PowerBook's first dedicated utilities package. A simple, drag-and-drop, Finder-based file-synchronization scheme is the most notable addition, and Henry Bortman has more to say on that in Mobile Mac in this issue. Some of the other improvements include location management and a new interface.

CPU 2.0 lets you create different sets of network configurations for your office and home and then automatically connects you to the appropriate servers and printers as soon as you plug your PowerBook in to the net.

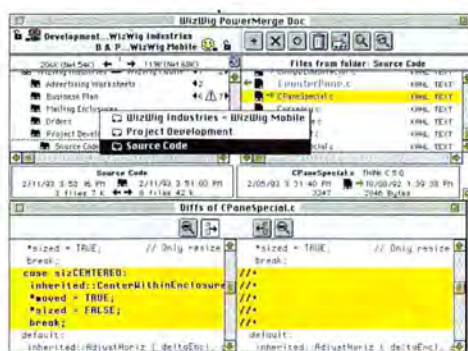
The new interface lets you activate all the modules from a single control panel and gives power users the option of dealing with each module individually.

Synchronize! 2.1 (\$59), from Qdea (612-779-0955), is a file-syncing package that uses a reasonably familiar dual-list approach to picking which files, folders, or volumes to synchronize in addition to offering all the syncing options users have come to expect. With Synchronize!, you can move files based on specific criteria, and you can set the program to automatically perform a file sync or file copy on startup, quit, or shutdown.

Meanwhile, **PowerMerge** (\$129), from Leader Technologies (714-757-1787), has been upgraded to version 2.0. PowerMerge can now automatically reconcile files and folders that have been moved, renamed, or deleted on one volume and that need to be kept parallel on another. PowerMerge also lets you designate a volume or folder as a "master document" that must always be matched, and the program will do whatever is necessary—including moving and deleting files—to keep an exact duplicate of that master document.

PowerMerge 2.0 also lets you view two versions of a text document side by side so you can quickly transfer material from one to the other.

Currently, PowerMerge 1.0 is available through Apple as part of the new Duo Dock configuration.



The new Duo Dock comes with a 230-megabyte hard-disk drive, 1 megabyte of VRAM (for 16-bit color) installed, and PowerMerge, all for a suggested retail price of \$1,975.

Up to Date . . .

Apple has finally begun shipping the **Express Modem** in the \$3,219 PowerBook 230 package. 408-996-1010. ★ **Tempo II Plus 3.0** is Affinity Microsystems' first System 7 version of its macro package. Version 3.0 has Apple-event support, including conditional branching. 303-442-4840. \$179.95. ★ **StrataType 3d 2.0** is the first upgrade of Strata's 3-D type-creation package. New features include multiple light sources, light-source gels, and kerning control. 801-628-5218. \$295. ☞

By Russell Ito



In Focus Systems' PanelBook packs an active-matrix LCD projection panel into a unit that's only slightly larger than a PowerBook.

PowerBook Panel

About a year and a half ago, just pulling out a PowerBook would have been enough to make an audience pay attention to your presentation. But with Apple about to break the half-million mark on PowerBook sales, it takes more than just the machine to stand out now. The presentation of presentations is again the focal point, so In Focus Systems has introduced the PanelBook, a new, color, LCD, active-matrix projection panel designed especially for mobile presenters.

The PanelBook's unique design accommodates a full-function portable display panel in a package that, at just 11.5 x 9.5 x 2 inches, is only slightly larger than a PowerBook. The key to shrinking the panel to a size as much as 40 percent smaller than that of typical panels lies in In Focus' new design, which incorporates a drawer in the

front of the panel. Instead of having the I/O ports located on the edges of the panel, the PanelBook has its ports on one side of the drawer. Whenever you need to plug in the PanelBook, you open the drawer. When you're not using the PanelBook, you can close the drawer and save the space.

The PanelBook, which can display as many as 1.4 million colors, offers a full-screen resolution of 640 x 480 pixels and can project NTSC and PAL/SECAM video in addition to Mac video.

A thin, "smart" remote control comes with the PanelBook and is stored in the drawer. The remote control lets you control the panel's settings without interrupting your presentation, and it includes a customizable button you can program to execute the function you use most often.

In Focus Systems, Inc., 7770 S.W. Mohawk Street, Tualatin, OR 97062; 800-327-7231 or 503-692-4968. \$5,995.

ClarisWorks Beefs Up

The unique conundrum facing the developers of integrated packages is to make their application more powerful without making it bigger and more complicated. That was a big part of the challenge facing Claris as it prepared the first major upgrade of its best-selling ClarisWorks package, and it seems to be a task in which the company succeeded. ClarisWorks 2.0 includes three entirely new functions — integrated outlining, presentation, and color painting — and a host of other improvements but still manages to come in at just under 600K in size.

The outliner is fully integrated with the word processor and comes preconfigured with eight outline styles, which can be customized as needed.

The presentation function lets you create slide shows with most of the presentation tools you've come to expect from dedicated packages. It offers QuickTime support and master slides but lacks a slide-show player.

The paint environment complements the draw functions that were available in the original ClarisWorks, adding 18 paint-specific tools plus gradients and the ability to work with images with as many as 24 bits.

In addition, all of ClarisWorks' existing modules have

been enhanced. The word processing, spreadsheet, and database functions boast the most-notable improvements. The word processor now offers you automatic text wrap around objects, including irregularly shaped objects; custom text styles (but not style sheets); and variable column widths you can set by simply dragging the column guides.

The spreadsheet program's improvements are primarily in its charting functions. Several new chart types have been added, including hi-low-close, easy-to-create combination charts, and pictograms. Spreadsheets can now word wrap within a cell.

The database program's data-entry capabilities have been expanded to include pop-up menu entry and automatic field validation (for uniqueness, range, and emptiness). For mailing-list management, ClarisWorks 2.0 also includes more than 50 predefined formats for the most popular Avery-label sizes.

ClarisWorks 2.0 also includes Claris Shortcuts, palettes of buttons that let you access more than 150 commands with just a click.

About the only improvement Claris hasn't added to ClarisWorks 2.0 is direct support for FileMaker Pro in the database module. Guess we'll have to wait for version 3.0 before we get that option.

Claris Corp., 5201 Patrick Henry Drive, P.O. Box 58168, Santa Clara, CA 95052; 408-727-8227. \$299.



New features in ClarisWorks 2.0 include an integrated outliner and a presentation function.

NewsLine

Reports and Analysis

NeXT's Last Step?

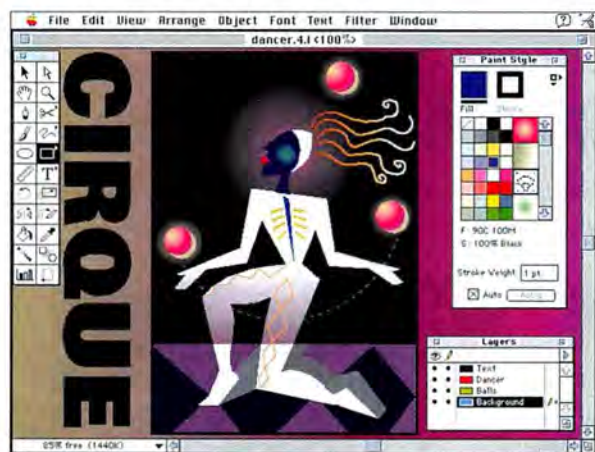
REDWOOD CITY, CA — Steve Jobs' quixotic seven-year adventure with NeXT Computer has come to a crossroads. After reporting the company's first-ever quarterly profit at the close of 1992, the once-hot computer manufacturer announced that it would be shutting down its hardware operations, eliminating more than half of its work force in the process. The layoff of some 300 of NeXT's 530 employees marks the company's last-ditch attempt at success, whereby it refocuses its efforts on software and the task of porting its NeXTstep development environment to Intel processors. The company's sluggish sales have never fulfilled the promise Jobs predicted, and many analysts have felt that Jobs should have pursued the software side of the operation more aggressively years ago.

HyperCard Goes Home

CUPERTINO, CA — After languishing in limbo at Claris for more than a year, HyperCard is finally going home — back to Apple. Apple Computer and Claris announced that future versions of HyperCard will come from Apple's Developer Tools group and that future versions of HyperCard will ship under the Apple name. In the interim, Claris will continue to market, sell, and support HyperCard, pending the next release of the product. Once the Apple-labeled version is released, all support, sales, and marketing responsibilities will be Apple's. Apple's reason for reclaiming the orphan package was to get HyperCard in sync with the AppleScript scripting technology that is a cornerstone in Apple's plans for integrating applications into custom solutions.

Aldus on the Rocks

SEATTLE, WA — Once the king of the DTP jungle, Aldus has fallen on hard times. The close of 1992 saw Aldus reporting its lowest earnings since it went public in 1987. The company's earnings of \$6.8 million reflected a 71-percent decline in earnings from the previous year. Although Aldus' fourth quarter saw a 7-percent increase in revenues, the company's net income plunged 58 percent, to \$1.9 million, compared with the previous year's \$4.5 million. In recent years, PageMaker, which accounts for more than 50 percent of Aldus' income, has lost market share to both QuarkXPress on the high end and Word 5.0 on the low end of the page-layout spectrum.



Finally, Illustrator 5.0 adds many of the functions Illustrator users have demanded, including an editable Preview mode, layers, and true gradients plus a new plug-in architecture.

Illustrator Skips a Generation

It's been a long time since Illustrator had a major upgrade, and in fact, because it's been such a long time, Adobe has skipped an entire version number, going straight from version 3.0 to version 5.0. In addition to giving users the features — including such items as an editable Preview mode, true gradients, and layers — they've been screaming for for years, Illustrator 5.0 offers a wealth of new capabilities.

Illustrator 5.0 users can now work in Preview mode with full color. What's more, when you use Illustrator's new layering function, you can work on one layer in Preview mode while leaving the rest of the screen in Artwork (line art) mode. Illustrator uses a simple drag-and-drop approach to layers, so moving an object to another layer is a simple matter of dragging the object and dropping it on top of the desired layer in a floating palette. Likewise, rearranging layers is a simple matter of dragging their names around in the palette.

Plug-in filters have also been added to Illustrator 5.0, but they aren't Photoshop-compatible. The program is shipping with a variety of filters for combining paths; finding objects; and creating drop shadows and common objects such as arrows, stars, and spirals. The plug-in format is being made available to third-party developers.

Among the other miscellaneous enhancements are multiple levels of Undo, custom page sizes, a pressure-sensitive calligraphic pen with a customizable nib, and custom views.

Adobe Systems, Inc., 585 Charleston Road, Mountain View, CA 94039; 415-962-4400. \$595.

Electronic Paper

From Farallon Computing's near-mythical Disk-Paper to Adobe Systems' pending Acrobat, and even going back to Solutions' Glue, developers have long sought the answer to opening and viewing a document without using the originating application. The latest entrant into the field is Common Ground, from No Hands Software.

In essence, Common Ground lets you print your document to disk by using the Common Ground Maker Chooser driver or by dragging the original on top of the Common Ground AutoMaker icon in the Finder. You can then distribute the resulting image of the file to other users, who can open it with the Common Ground viewer. Because the Common Ground file is an image of the original, it isn't

editable, but it does retain all the graphics as well as representations of all the fonts in the document.

The Common Ground viewer includes text-searching capabilities and lets you copy and paste text and graphics into other applications for editing.

No Hands Software, 1301 Shoreway Road, Suite 220, Belmont, CA 94002; 415-802-5800. \$189.95.

OUTPUT DEVICES

LaserWriter Pro 630

Apple takes on Hewlett-Packard with the impressive 600-dpi LaserWriter Pro 630.

Shortly after Hewlett-Packard introduced the low-cost 600-dpi LaserJet 4M printer, Apple followed suit with its own attractively priced 600-dpi-printer offering. The Apple LaserWriter Pro 630 is based on the same Canon engine as the LaserJet 4M, so it's no surprise that it competes head to head with the HP printer in performance and output quality. Depending on your printing needs, Apple's offering has distinct advantages and disadvantages. For those who have lots of fonts to store, the LaserWriter Pro 630 can connect to hard-disk drives, a feature the 4M lacks. However, if you're looking for a workgroup printer that can juggle the demands of heavily trafficked mixed Mac-and-PC networks, the LaserJet 4M is clearly the top dog.

The Basics

The LaserWriter Pro 630 Accessory Kit comes with software that allows the printer to work with Macs as well as Windows-based PCs. The Mac software installs a bevy of TrueType fonts as well as the latest version of PrintMonitor and the LaserWriter driver. The kit also includes the LaserWriter Utility program, which lets you control printer defaults such as startup page, PhotoGrade and FinePrint, output resolution (300 dpi or



LaserWriter Pro 630
Manufactured by: Apple
 Computer, 20525 Mariani Avenue,
 Cupertino, CA 95014;
 (408) 996-1010.
List Price: \$2,529.

600 dpi), and the number of gray levels. As this article went to press, the LaserWriter Pro 630 package lacked a printer-description file for PageMaker and QuarkXPress, but we found that the printer-description file for the Varityper 600-dpi printer included with both the PageMaker and the QuarkXPress packages worked just fine. Most likely, printer-description files will be available for the LaserWriter Pro by the time this review appears.

The LaserWriter Pro 630 is equipped with LocalTalk, Ethernet, Centronics parallel, and RS-232 serial ports. Unlike HP's LaserJet 4M, the Apple printer comes with external and internal SCSI ports, so you can attach hard drives for font storage. Instead of offering the usual 50-pin SCSI interface, the LaserWriter Pro 630's external SCSI port uses the 29-pin connection familiar to PowerBook users, so you may need to purchase an

additional cable for SCSI hookup.

Out of the box, the LaserWriter Pro 630 is primed and ready for LocalTalk as well as EtherTalk networks. (Apple's other 600-dpi printer, the LaserWriter Pro 600, doesn't provide built-in support for EtherTalk.) The LaserJet 4M, on the other hand, comes with LocalTalk built in, but you need to purchase a separate Ethernet interface card to connect it to an Ethernet network.

Like the LaserWriter IIg, which it replaces, the LaserWriter Pro 630 incorporates Apple's FinePrint and PhotoGrade output-enhancement technology for printing at 300 dpi. The printer comes with the standard 35 LaserWriter Plus PostScript fonts as well as with 29 TrueType fonts.

Although it offers both PostScript Level 2 and HP LaserJet IIP (PCL 4+) emulation, the LaserWriter Pro doesn't automatically switch between the two printer languages, as does the LaserJet 4M. Instead, you must manually select the desired emulation by using the LaserWriter Utility software or by adjusting switches on the back of the printer.

In order to test the capabilities of the LaserWriter Pro 630, we put the printer through the same series of tests we used to test the LaserJet 4M (see review, March '93, page 54). We used a composite PageMaker test document that included a gray-scale image, type samples in a range of point sizes, QuickDraw graphics, and gray ramps for testing gradient-fill quality. We also used a 50-page text file to test the printer's page-per-minute rating. For all of our tests, we used LocalTalk to connect the LaserWriter Pro 630 equipped with its standard 8 megabytes of memory (expandable to 32 megabytes) to a Macintosh IIfx with 5 megabytes of memory.

The LaserWriter Pro 630's 25-MHz 68030 microprocessor proved to be more than a match for the LaserJet 4M's much-touted RISC processor. It processed a PageMaker document at 600-dpi resolution in 18 minutes and 59 seconds,



Apple's 8-ppm LaserWriter Pro 630 is network-ready for both LocalTalk and EtherTalk. Compact and well designed, the printer conveniently encloses its paper trays.

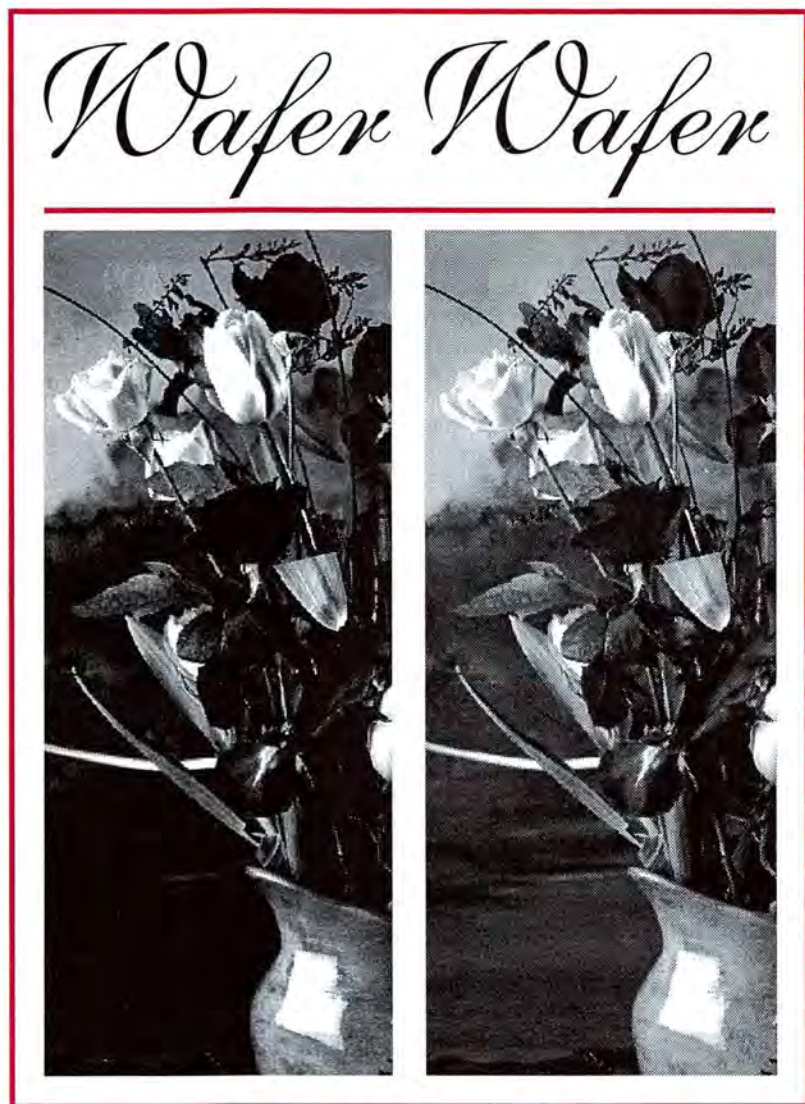
compared with the LaserJet 4M's 20 minutes and 21 seconds on the same task. The output quality of the LaserWriter Pro 630 was stunning, closely matching that of the LaserJet 4M. Moreover, with the LaserWriter Pro 630 set at 300-dpi resolution with PhotoGrade activated, gray-scale-image quality was equal to — and in some cases better than — that of the printer's own 600-dpi output. Type quality at small point sizes, however, was decidedly crisper at 600 dpi than it was at 300 dpi, even with FinePrint activated. The one disappointment with the LaserWriter Pro 630 is that neither FinePrint nor PhotoGrade is available at 600 dpi.

Our text-document test clocked the LaserWriter Pro 630 at a rate of about 7 pages per minute, the same speed as the LaserJet 4M.

With its paper trays neatly enclosed within the printer, the LaserWriter Pro 630 is a sleek and elegant addition to the desktop. The built-in multipurpose tray holds a variety of media, including envelopes, transparencies, and as many as 100 sheets of paper (including legal size). A separate removable, 250-sheet paper tray is also provided for letter-sized or A4 paper. You can purchase optional paper trays, including a 500-sheet feeder and an envelope feeder. An automatic tray-switching option lets the printer switch from one tray to the other when the first tray empties, so you can print as many as 350 pages without refilling the paper trays. You can tell the LaserWriter Pro 630 to take the first page of a multipage print job from one tray and all the subsequent pages from the second tray. You control the printer's paper-cassette selection in the standard Print dialog box. To change other output options, such as resolution, PhotoGrade, and FinePrint, you can click on the Options button in the Print dialog box or use the LaserWriter Utility software.

Completed print jobs zip out into a built-in output tray located on top of the printer, which has both manual and automatic feed. A row of status lights on the front of the printer keeps you informed about such things as job progress and paper problems.

The LaserWriter Pro 630 employs a toner cartridge that has a rating of 6,000 pages at 5-percent density, which is identical to the rating of the LaserJet 4M cartridges. You install toner cartridges



For gray-scale images, the quality of the LaserWriter Pro 630's output at 300 dpi with PhotoGrade active (left) closely matches that of the HP LaserJet 4M's output at 600 dpi (right). Type output at 600 dpi from the LaserWriter Pro 630 (top left) is on a par with that from the HP printer (top right).

conveniently at the top of the printer.

Overall, the LaserWriter Pro gets high marks for its well-thought-out design.

The Bottom Line

Apple's new 600-dpi LaserWriter Pro 630 is stiff competition for HP's LaserJet 4M. Both printers are capable of producing stunning output quality, and both offer similar advantages in price and compact design.

Unlike the LaserJet 4M, the LaserWriter Pro 630 doesn't require that you purchase additional cards for any of its

networking configurations. Another advantage is that the Apple printer has two SCSI ports, so you can attach a hard drive for font storage. However, those in mixed computing environments may prefer Hewlett-Packard's LaserJet 4M, with its ability to sense the nature of incoming jobs and switch automatically between PostScript and PCL emulations on the fly.

Consumers are clearly the winners in the race between Apple and HP to set new laser-printer standards.

— Gregory Wasson

PERFORMANCE ENHANCERS

RocketShare

RocketShare transforms your Mac into a multiprocessing powerhouse.

If you frequently use CPU-intensive applications that tie up your Mac for long periods of time, you're probably longing for another machine that can share some of the processing load. But before you empty your wallet to purchase another Mac, consider acquiring RocketShare (\$499), from Radius. This software turns a single Mac equipped with one or more 68040 Radius Rocket accelerator cards into a multiprocessing powerhouse. RocketShare software is a technological tour de force that gives System 7 powers only dreamed of until now. As with most pioneering concepts, the initial release of RocketShare has a few rough edges: Controlling multiple Rocket cards with the software gets confusing, and setting up RocketShare is an exercise in patience. However, this Radius product can be a cost-effective option, particularly for those who are heavy users of 3-D-design and high-end color publishing applications.

From Rocket to RocketShare

RocketShare comprises a set of System 7 software extensions that allows the Mac motherboard and one or more Radius Rocket accelerator cards to process several applications simultaneously. The concept behind RocketShare began with the Rocket card, which comes equipped with its own processor and on-board memory. The card takes control of your Mac when you install it, generally bypassing the host machine's motherboard and memory. However, Radius decided that it made better sense to fully exploit the host Mac's built-in resources, so it produced RocketShare, which lets both a Rocket card (Radius Rocket 25, 25i, 33, or 40) and the host Mac operate simultaneously as fully independent CPUs.

You can install as many Rocket accelerator cards as you have free NuBus slots and then control them with RocketShare. RocketShare adds considerable functionality to the host Mac by turning it into a true multiprocessing environment. All



RocketShare 1.0

Published by: Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131, 408-434-1010.
List Price: \$499.

Macintosh IIs (including the Mac IIx but excluding the IIsi), Centrises, Duo Docks, and Quadras can currently use Rocket cards and RocketShare.

Each Rocket card running under RocketShare launches independently of the host Mac and opens its own desktop, which appears as a standard Finder window on the host Mac's desktop. You can use RocketShare to offload any application from the host Mac to the Rocket card. The Rocket card's application runs in the background as you work with another application on the host CPU (or on another Rocket card). In a typical multiprocessing scenario, you may be working with QuarkXPress in the foreground on the host CPU as the Rocket CPU simultaneously processes a complex Photoshop operation.

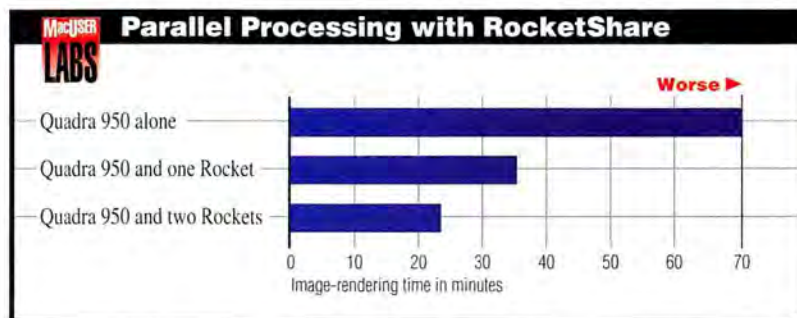
Processing in Parallel

In addition to being able to multiprocess several applications on a single Macintosh, RocketShare makes parallel processing of one IAC (interapplication

communication)-aware application possible. Parallel processing allows you to considerably shorten the time required to do a single time-consuming operation, such as rendering with Specular International's BackBurner, by dividing the processing among multiple Rocket cards and the host CPU.

In theory, RocketShare is A+ technology. In practice, however, there are several caveats. The first concerns installation. Each Rocket card you run under RocketShare requires its own System Folder and at least one disk, which means that you must either dedicate a hard disk as a RocketShare volume or create RocketShare volume partitions on existing disks. For optimal performance, we recommend dedicating an entire hard disk to each installed Rocket card, so two cards don't have to share access to the same disk. However, to dedicate a hard disk, you need to purchase a \$299 SCSI-2 daughtercard from Radius. Furthermore, when you have RocketShare disk partitions, you can't use disk utilities, such as optimizers or automatic disk and file compressors. If you do, you may destroy the hidden files that identify the Rocket-card volumes to RocketShare.

Moving files among Rocket cards is not intuitive. The disk volumes assigned to the host CPU and to the Rocket cards use AppleTalk protocols over the Mac's



By adding one Rocket accelerator card to a Quadra 950 running under RocketShare, you can cut the time required to render a 3-D image in half. The addition of a second Rocket card can reduce rendering time to one-third the time of the Quadra alone.

NuBus (Radius calls this Bus-Net) to communicate with one another, so you can't simply click and drag to copy files among the virtual desktops created by RocketShare for each CPU. Instead, you must use System 7's file-sharing capabilities. This solution works, but it is rather unconventional.

There is a speed advantage, however, to using the host Mac's NuBus as the network that connects the Rocket cards and the host CPU. Compared with distributed processing among multiple Macintoshes connected to an Ethernet or LocalTalk network, distributed processing over Radius' Bus-Net is noticeably faster.

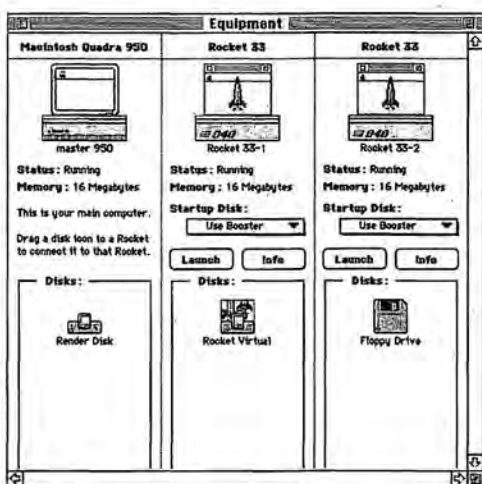
One last caveat: It gets tricky if you're trying to control more than one Rocket card with RocketShare. It's easy to get confused about which Rocket card's virtual desktop you are viewing. We recommend using at least a large-format monitor. A separate monitor for each virtual desktop would be an even better solution.

Overall, RocketShare works as promised, but it can be finicky to set up and use. Its interface departs significantly enough from the Mac desktop's conventional look and feel to be slightly disconcerting. However, once we'd used the program, we found that RocketShare can indeed save lots of time.

Test Runs

We set up two tests to put RocketShare through its paces. The first was a test of multiprocessing in which two Rocket cards each performed a separate application. The second was a test of parallel processing, in which a single application was performed by the host Mac and two Rocket cards.

Our test platform was a Quadra 950 that was equipped with 16 megabytes of RAM and two \$2,495 Radius Rocket 33 accelerator cards, each loaded with 16 megabytes of RAM. The host Macintosh and each Rocket card had its own dedicated hard-disk drive. Each hard disk was set up with System 7.0.1 with Tune-Up. (When this review went to press, Radius had not fully certified the compatibility of RocketShare with System 7.1.)

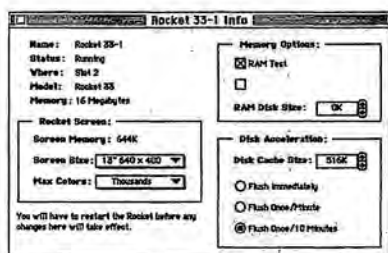


Under RocketShare, each Rocket card requires its own hard disk or disk partition, which you assign with RocketShare's Mission Control Equipment window.

In the test of multiprocessing capability, we first performed a RIP (raster-image processor) operation, using only the Quadra CPU. We printed a PostScript file to a Kodak XLT 7720 printer, using QuarkXPress and ColorAge's Freedom of Press PostScript interpreter (the printer was connected directly to the Quadra), and then we did the same with a complex Photoshop operation. We then performed the same two operations simultaneously, by running each one on one of the Rocket cards, with the printer connected directly to the Rocket card performing the raster-image processing. Each card operated completely independently of the other, so we were able to perform the two operations in the same amount of time it took the Quadra to perform only one.

To do our tests of parallel processing, we used BackBurner 1.0 to render an image created with Specular International's Infini-D. The Quadra by itself took about 70 minutes to render the image. When we divided the processing of the operation between the Quadra and one of the Rocket cards, we were able to cut the rendering time in half. When we added a second card, the rendering took only one-third as long.

The more Rocket cards running under RocketShare you have installed in your Mac, the more time you can save by assigning each card a regular daily task (such as image rendering and processing) to perform simultaneously, rather than one after the other. Moreover, no



The RocketShare control-panel dialog box lets you configure settings, such as memory and screen options, for each Rocket accelerator card running under RocketShare.

matter how many Rocket cards you have processing in the background, the performance of the host CPU is unaffected.

The Bottom Line

Radius gets high marks for coming up with the Mac's only true general multiprocessing product. RocketShare works by essentially adding a new layer of operating-system functionality to System 7 — which is no mean technological feat.

Although RocketShare makes use of Radius' Rocket cards, it represents a significant departure from the traditional use of accelerators. By themselves, accelerator cards clearly can boost the overall performance of your Mac. You can even buy accelerators that are custom-designed for specific CPU-intensive tasks such as rendering. But what sets RocketShare apart from traditional accelerator setups is its ability to allow several applications to run simultaneously or to divide the processing of a single operation among a host CPU and multiple Rocket cards.

RocketShare can be a cost-effective alternative to buying another powerful Mac, but it exacts a price in usability. Setup can be tricky, and the software doesn't work with compression utilities, because of its disk-partitioning scheme. In addition, because RocketShare uses AppleTalk protocols to pass data among the host CPU and the installed Rocket cards, it's not as convenient to copy files between the host's disks and the cards' disks as it is with the Finder.

Overall, we found that RocketShare's execution needs polishing, but if you're willing to put up with the first version's idiosyncrasies, RocketShare can deliver productivity gains that no other product can match.

— Don Crabb

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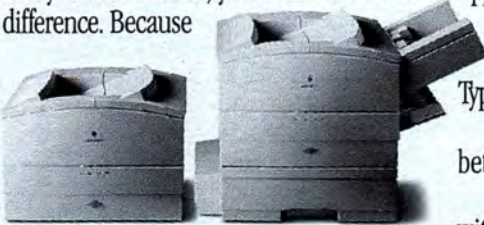
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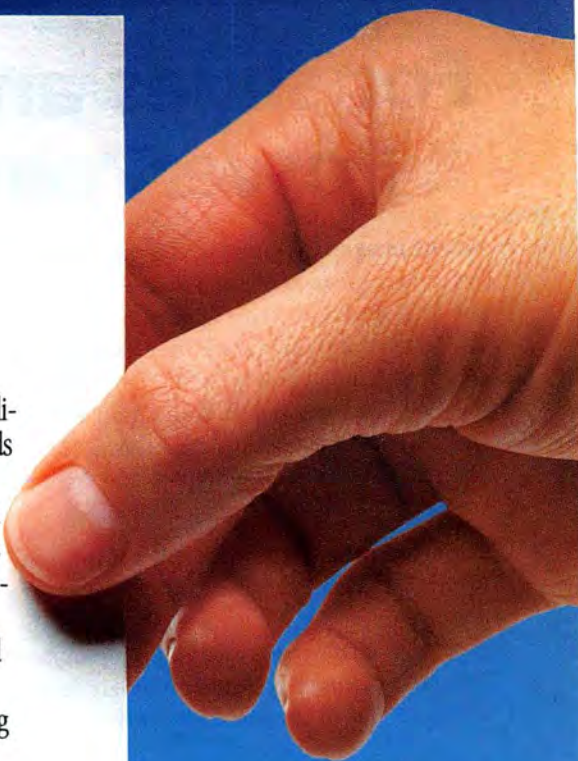
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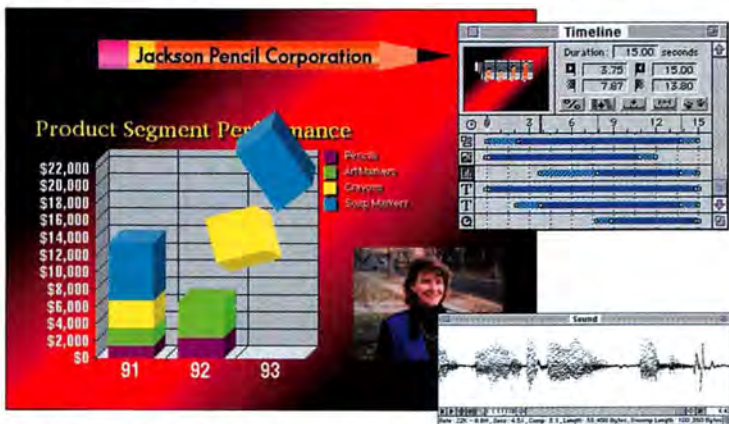
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GOLD DISK

UTILITIES

AutoDoubler, More Disk Space, and SpaceSaver

Three compression utilities shrink files to create more hard-disk space.

For those who frequently find themselves bumping up against the hard-disk-capacity ceiling (and nowadays that's just about everyone), three Finder-level-compression utilities offer an inexpensive alternative to buying a higher-capacity storage device. AutoDoubler, More Disk Space, and SpaceSaver each take their own tack toward compressing files. AutoDoubler is not the best-looking or the friendliest, but it excels at technical virtuosity; More Disk Space offers the biggest bag of tricks; and SpaceSaver is the most attuned to the way users work.

AutoDoubler

Packed with features, AutoDoubler gives you the most automatic background-compression options of the three utilities. For example, you can activate and deactivate background compression by moving the cursor to a "hot" zone on the screen; adjust the utility's internal file cache, which lets you manage memory and performance trade-offs; exclude files of a certain size from compression (this comes in handy because large compressed files can take a long time to open); and get a savings-statistics report that tells you how much space AutoDoubler has saved on a volume. A dialog box also lets you specify when AutoDoubler starts compressing files. For example, you can set it to wait five minutes after the last mouse movement



AutoDoubler 2.0

Published by: Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; 504-291-7221.
List Price: \$89.95.



More Disk Space 2.1

Published by: Alysia Software, 1231 31st Avenue, San Francisco, CA 94122; 415-566-2263.
List Price: \$99.95.



SpaceSaver 1.03

Published by: Aladdin Systems, Inc., 165 Westridge Road, Watsonville, CA 95076; 408-761-6200.
List Price: \$59.95.

or keystroke before it begins performing background compression. AutoDoubler scores extra points for including several other tools. Most notable is the CopyDoubler control panel, which dramatically reduces the amount of time the Finder takes to copy files and empty the Trash. Although all three of the utilities reviewed here passed our torture tests for safety, AutoDoubler is the only one of the three that provides a data-recovery program, which pieces together damaged files that the main utility can't decompress.

The one drawback of AutoDoubler is that because it's designed primarily for compressing entire volumes, it's not easy to optionally exclude files from compression. Although the utility's control panel lets you exclude specific folders and individual items from compression, the process is somewhat cumbersome. You can also exclude items from compression by assigning them a specific Finder label or by simply appending .dc to the filename.

More Disk Space

More Disk Space (MDS) gets off on the wrong foot right away by operating as an application and not as a control



Compared to FileMaker® Pro, Helix Express is the more intelligent choice. There are oceans of differences between a flat file database (like FileMaker, for example) and Helix Express. A flat file program can handle basic business needs. But a relational database program like Helix Express has more depth, and the capability to grow as your needs grow.

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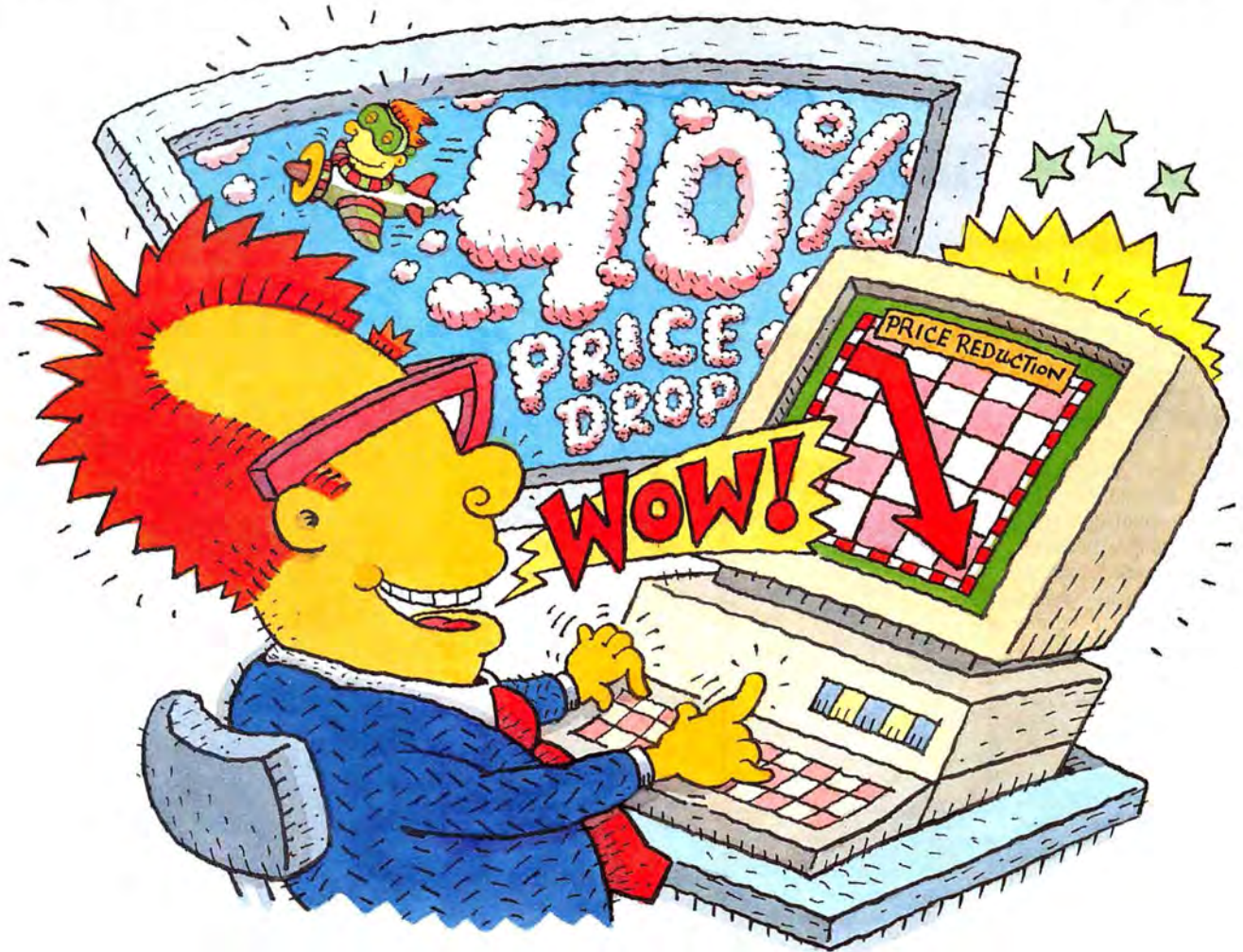
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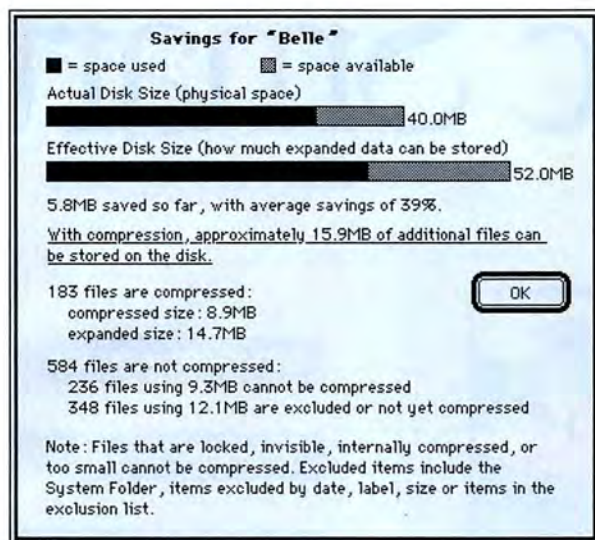
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Format Conversion ☒ SuperDisk! Files ☒ Stuffit Files
☒ D/D Filter ☒ Ignore 1 to 31 Kbytes

Volumes Needing More Disk Space: **Belle**

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Use Defaults

v1.0

panel, as do the other two utilities reviewed here. In addition, the utility adds resources directly to your System file. This is a major inconvenience, because if there's a software conflict, you can't simply switch MDS off temporarily. More troubling is that there's no way you can remove MDS without installing a new System file or directly removing the utility's resources.

To configure MDS for background compression, you must create an alias of the MDS application and add it to your Startup Items folder. This setup is effective, but it's a bit more cumbersome than the simple control-panel approach the other two utilities use.

More Disk Space gives you even more-limited control over exclusion of files from compression than does AutoDoubler. You can tell it to ignore specific application and document types,

but you can't exclude single folders or batches of files from compression.

One advantage of MDS is that it supplements its Finder-level compression with the ability to automatically replace duplicate applications and documents with aliases — a real space saver on large, ill-kept disks. MDS can also automatically compress applications at the resource level, which results in smaller applications that behave normally whether the compression utility is running or not (ResEdit and TeachText are examples of applications that are already internally compressed). AutoDoubler can compress applications internally too, but it requires user intervention. SpaceSaver lacks this feature entirely.

Finally, using MDS may be the cheapest way to bring transparent file compression to AppleShare servers. You can also install "expand only" versions of

AutoDoubler gives you lots of control over the file-compression process, even telling you how much disk space it has saved.

More Disk Space operates as an application. To get it to do background compression, you must make an alias of the program and install the alias in your System Folder.



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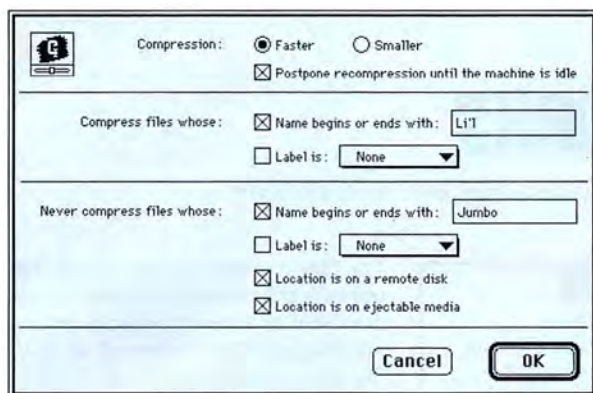
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The SpaceSaver compression utility is noteworthy for its simplicity and flexibility.

MDS on as many Macs on a network as you like, at no extra charge. By contrast, the makers of AutoDoubler and SpaceSaver don't recommend the use of their products on AppleShare servers.

SpaceSaver

SpaceSaver's appeal lies chiefly in its friendliness. In addition to designating an entire volume for compression, you can also control compression on a file-by-file basis by adding user-specified keywords to the files you want to compress. This approach gives SpaceSaver its big lead on the usability front. The utility also lets you exclude remote volumes and removable cartridges.

As well as providing ease of use and control over compression, SpaceSaver is a boon to users who regularly deal with compressed files in various formats. For example, you can unstuff a StuffIt file downloaded from a BBS (bulletin-board system) simply by deleting the .SIT suffix from its Finder filename. In addition, you can create new StuffIt archives in the Finder simply by adding .SIT or .SEA to filenames. The versatile SpaceSaver can also decompress Compactor Pro files and AppleLink packages.

If you regularly deal with a wide variety of compressed file types, however, you may want to consider spending a bit more on Aladdin's StuffIt Deluxe, the most comprehensive compression utility you can get. StuffIt Deluxe, which provides a utility for compressing files for telecommunications and archiving, includes SpaceSaver and costs about the same as the AutoDoubler package.

Put to the Test

When it comes to efficiency and speed, compression utilities can behave quite differently in different configurations.

For example, in an environment with multiple heavily trafficked Macs, More Disk Space's ability to alias duplicated files gave it, for all the Macs collectively, a big lead in disk-space saving over the other two utilities. However, tests that compared the products' ability to compress files, folders, and entire volumes individually yielded results showing that AutoDoubler provided a higher compression ratio than More Disk Space did, with SpaceSaver placing third in this category.

In terms of speed for compressing and decompressing files, the three utilities performed nearly equally, with AutoDoubler showing a slight advantage over MDS and SpaceSaver.

The Bottom Line

AutoDoubler, More Disk Space, and SpaceSaver all offer cost-effective ways to expand the capacity of your hard disk; however, we have trouble recommending More Disk Space. As an application that adds resources to your System file, it is cumbersome to both configure and remove from your system. On the other hand, More Disk Space is certainly worth looking into if you're primarily interested in network compression.

For features and ease of use, we give the nod to AutoDoubler and SpaceSaver. Your ultimate decision between the two largely hinges on what you expect from a Finder-level compression utility. If you're looking for the highest compression ratio and the broadest range of features, check out AutoDoubler. If, on the other hand, you're willing to forgo those advantages in favor of simplicity and flexibility and especially if you deal regularly with StuffIt archives, go and have a look at SpaceSaver.

— Andy Ihnatko



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GRAPHICS & DESIGN

artWORKS

Deneba packs the works into its low-cost draw and paint program.

If you're looking for the most versatile low-cost graphics program around, look no further than Deneba's artWORKS. For \$149, artWORKS boasts Canvas-style drawing tools, image editing that mimics several Photoshop operations, a slew of SuperPaint-like features, and innovative memory management. In addition, the program supports unlimited layers, 24-bit color, and more bells and whistles than you can shake a stick at.

Best of Both Worlds

Although artWORKS boasts draw as well as paint tools, it doesn't force you to move back and forth between the draw and paint environments — all tools are accessible at all times. In addition to its core tool set, artWORKS comes with a wide selection of external tools you can activate and deactivate with the program's ToolPicker, a feature that lets you manage the program's memory requirements and performance.

artWORKS' impressive set of drawing tools is almost identical to that of the more expensive Canvas. Tools include a flexible Bézier pen; the full-featured Alignment command; the Auto Trace command for converting bit maps to polygons or Bézier curves; the Duplication command, which makes multiple copies of objects while simultaneously shrinking, expanding, and rotating them; and the Blend command, for merging two or more objects.

The program also borrows several other tricks from Canvas' bag. It includes skewing and perspective effects as well as the ability to stretch objects by adding pixels. Like Canvas, artWORKS boasts the Gradient Fill Manager, which lets you create draw objects and apply multicolored blends to them.

The number of layers you can create with artWORKS is limited only by your Mac's memory. Each layer can contain draw as well as paint objects. The Layers submenu provides a variety of options for manipulating multiple layers, including the ability to hide any layer and



artWORKS 1.0

Published by: Deneba Software,
7400 S.W. 87th Avenue, Miami,
FL 33173; 305-596-5644.

List Price: \$149.

change the sequence of the layers.

You can create paint objects at resolutions as high as 2,400 dpi, and artWORKS offers excellent selection tools for manipulating them. For example, you can turn any selection into a mask and save it to disk. The Smart Mask command, which works much like Photoshop's Paste Into command, pastes an image into one or more selected paint areas and clips images outside the selections, but Smart Mask doesn't give you the control that Photoshop does over the exact positioning of the pasted image. The Smart Smoothing anti-aliasing feature automatically smooths the edges of lines and shapes you add to paint images.

In addition to the standard collection of draw and paint tools, artWORKS offers several special external tools. The Multigon and Star tools let you draw cubes, stars, and multigons (radially symmetrical shapes). The QuickTime tool lets you import QuickTime movies and sounds and place them in your artWORKS documents. If you have a pressure-sensitive digitizing pad, you can use it with artWORKS' Pressure Pen tool.



artWORKS provides more tools and features than any other low-cost graphics program.

The Magic Wand provides precise control over color-based selections — you can use it to select contiguous areas of matching color or portions of an image that lie outside masked areas.

For special painting effects, artWORKS provides the Fingertip and Water Droplet tools, for blurring and softening color areas, as well as the Chalk and Charcoal tools.

artWORKS' color support is based on the familiar 256-color palette. You can, however, increase the number of colors on a palette beyond 256 and save and load various palettes.

Transfer modes on the artWORKS' Pen Mode palette include Transparent, Opaque, and Invert. In Transparent mode, you can control the transparency of objects, but this effect prints properly only to non-PostScript printers.

artWORKS provides 17 filters for modifying paint images. Similar to those in Photoshop, they include Emboss, Sharpen, Blur, and Motion. You can also use Photoshop plug-in filters to create even-more-spectacular effects.

Another bonus in artWORKS is the ability to save any document as a QuickTime movie. Each layer in the document becomes a frame in the movie.

If you frequently work with high-resolution bit-mapped images that require a lot of memory, you'll welcome artWORKS' automatic memory-management feature. Called Smart Memory, it frees you from worrying about file sizes and memory partitions by grabbing free system RAM from your Mac as the program needs it. Because artWORKS is entirely RAM-based, you may run out of memory when working with huge images if you don't activate virtual memory.

The Bottom Line

artWORKS is the best value you can find in an entry-level graphics program. With its superior drawing tools, carefree memory management, and support for Photoshop plug-ins, it's at the top of the list for first-time Mac artists on a budget.

— Eric Taub

OrgChart Express

Kaetron builds its org-chart utility on a database foundation.

It's a truism of business that organization charts are almost never up-to-date — people come, people go, titles change, departments are restructured. By using a behind-the-scenes database with the organization charts it creates, Kaetron's new utility, OrgChart Express, makes it easy for you to edit and manage large, complicated company charts that change more often than they stay the same. Unfortunately, the program's innovative and useful database approach is somewhat marred by several poorly implemented features.

OrgChart Express provides all the standard features you expect from an org-chart utility. It offers a wide selection of tile types, lets you create different types of links among tiles, and provides several specialized selection commands and viewing choices. With these standard tools, you can create charts that graphically illustrate everything from simple company structures to complex hierarchies with co-managers, job sharing, and dotted-line responsibilities.

The program differentiates itself from other org-chart utilities by incorporating a database that lets you view your chart information as a series of editable database records as well as graphically. Each record in the database is associated with a tile in your chart. One advantage of this approach is that it makes editing a large chart easy. Suppose your company has just installed a new phone system and everyone's extensions, which are detailed on the chart, have changed. The beauty of OrgChart Express is that it lets you update charts by editing records in the database (from start to end, so you won't miss any) rather than by hunting and pecking through the chart itself.

Another plus of this org-chart utility is more subtle. The database streamlines the process of assigning different roles to the same employee. For example, if Lois Lane is both an administrative assistant and a trade-show coordinator, you can use the database editor to assign Ms. Lane two roles without entering the same personal information (name, address, and



OrgChart Express 1.0
Published by: Kaetron Software
 Corp., 12777 Jones Road, Suite
 445, Houston, TX 77070;
 713-890-3434.
List Price: \$199.

Social Security number) twice. And when you change the personal information in one record, the program updates all the records that pertain to Ms. Lane.

Still another advantage of the database is that it lets you enter data that doesn't have to be displayed in the chart, so you can easily change your mind on the fly as to what information shows up in the tiles. It also lets you import records from other databases without worrying about all the fields showing up in the chart. Furthermore, your chart can, in effect, double as your employee database. Our only criticism of the database implementation is that it doesn't let you add new records while you're using the database editor — to do so, you must switch to the chart and add a new tile.

OrgChart Express also gives you lots of flexibility in creating charts. Its floating Style Gallery lets you create an unlimited number of tile styles, using different fields, fonts, line thicknesses, and colors. Once you've created a style, you can apply it to all or some of the tiles in

an existing chart; if you make a change to a tile style, the change is automatically reflected in all tiles that use that style. Unfortunately, you can't include tile shadows and line types in the Style Gallery.

The package offers a plethora of features — perhaps too many for a utility that should cater to simplicity. It seems that the programmers of OrgChart Express simply couldn't stop tinkering. This may explain why the manual is sadly out of sync with the shipping product. OrgChart Express ships with a 30-page photocopied supplement, plus a 1-page installation sheet, plus an on-disk Read Me file that documents still more last-minute features and changes.

We also encountered software-related problems. Several crashes occurred when we imported data, and we were unable to delete styles from the Style Gallery, even though the program's Clear command is supposed to do exactly that. Another irritation is Undo — it often doesn't. It's especially frustrating that you can't easily undo the effect of the Clean Up command.

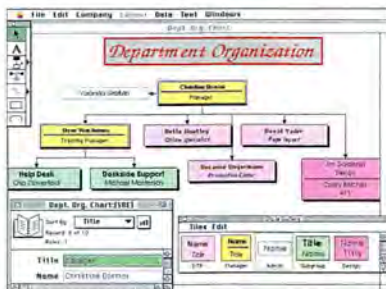
Another problem is confusing terminology. For example, in the program, org-chart boxes are termed *items*, whereas the documentation refers to them as *tiles*.

The Bottom Line

OrgChart Express brings some imaginative features to org-chart management. We greedily embrace its use of a database and hope that Kaetron will enhance this feature in the next release. The program also offers a less rigid approach to tile creation and manipulation than does its main competitor, Org Plus, from Banner Blue Software.

OrgChart Express clearly exhibits a lot of promise, although the first iteration suffers from a few rough edges. Nevertheless, if the program's innovative database approach appeals to you, OrgChart Express would be well worth a test drive.

— Dave Valiulis



OrgChart Express is the only org-chart utility that has a built-in database (lower left of screen). The Style Gallery (lower right) lets you easily make global changes to charts.

The Mac Zone
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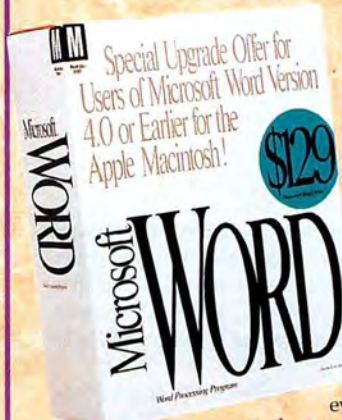
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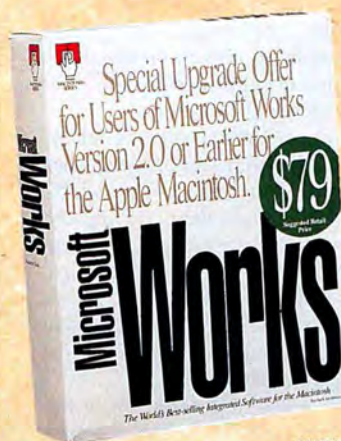
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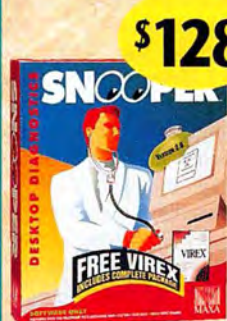


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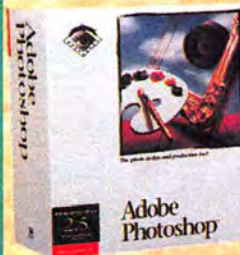
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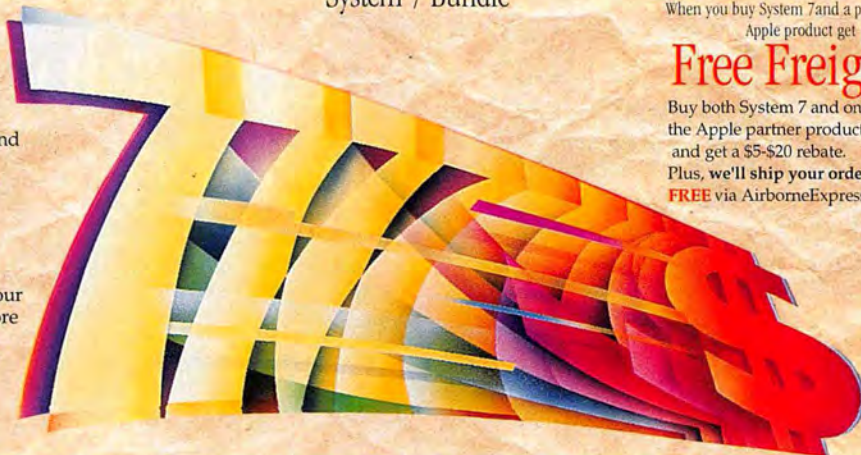
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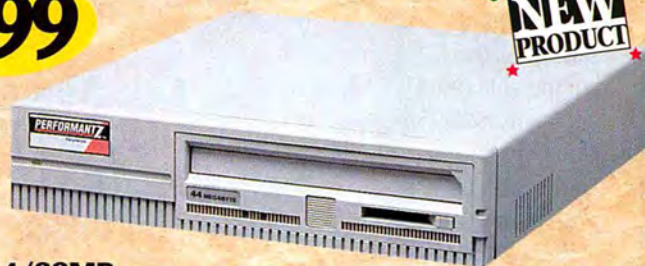
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PRESENTATIONS

Passport Producer

Passport Producer turns your Mac into a multimedia ringmaster.

Passport's new multimedia-presentation software, Passport Producer, tackles the complexities of combining and synchronizing audio, video, graphics, and animation. No trivial task, media integration is one of the primary hurdles encountered by corporate communicators and producers when they create and deliver multimedia presentations on the Macintosh. Coming from a company best-known for its music and MIDI software, Producer receives high marks for its use of a multitrack-mixer metaphor for media integration that is easy to comprehend and to use. Several flaws hobble version 1.0's overall performance, however.

Take Your Cue

Most of the work you do in Producer involves the Cue Sheet, a window that displays all the multimedia elements (called cues) that are in your presentation. Each element appears as a separate track in the Cue Sheet. Each track is associated with a location on the time line, which you can adjust to measure time in seconds or minutes.

An icon bar contains icons for each type of media file that Producer can import — QuickTime movie, PICT image, text, PICS animation, sampled sound, audio CD, and MIDI data. Producer is the only presentation software that directly supports MIDI, so you can import 16-bit audio files produced by such audio cards as DigiDesign's AudioMedia.

To begin building a presentation, you click on an icon that represents the type of media you want to incorporate into your presentation, drag the icon to a track on the Cue Sheet, and place it on the time line at the exact time you want it to appear. When you click on the icon, Producer brings up a dialog box that lets you associate the cue with the actual media



Passport Producer 1.0

Published by: Passport Designs,
100 Stone Pine Road, Half Moon
Bay, CA 94019; 415-762-0280.

List Price: \$495.

file that's stored on your hard disk. If you've placed an animation or a QuickTime movie, Producer automatically allows for the correct playback duration on the time line. Cues display the contents of the linked files — PICS cues display animation frames, audio cues display sound waves, and QuickTime cues display frames from movies.

SMPTE Time Code

Once you've positioned all your cues on the Cue Sheet, you can reposition them in time simply by sliding them up and down on their tracks. The time construct in Producer is based on SMPTE, a highly exact timing standard used by video and broadcast professionals that allows for precise synchronization of multimedia elements.

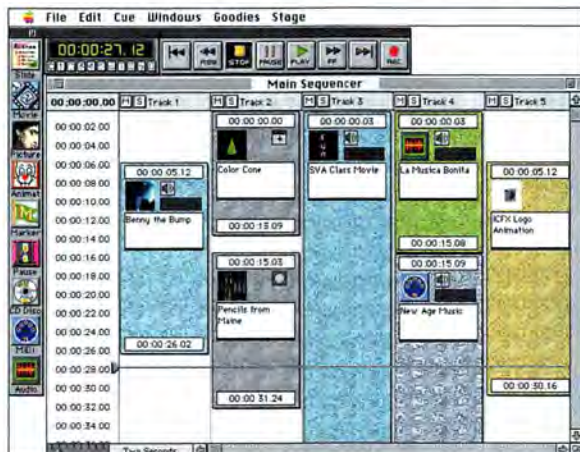
Producer lets you select multiple cues

and align them in time — a useful feature for synchronizing elements. To time cues more precisely, you can enter numeric specifications. Once all your cues are properly positioned, Producer's Cue Sheet provides an excellent view of all of your presentation elements and how they relate to each other over time, so you can see exactly when a sound file that accompanies a QuickTime movie will play, for example. You can also opt for a printout that details each track's timing and characteristics as well as any text notes you've attached.

To view all or part of your presentation, you can play it from any point on the time line. The presentation plays on the Stage, which can be a color background or an imported graphic. Producer gives you lots of flexibility for positioning elements — you can simply drag their windows anywhere on the Stage (this feature also works across multiple monitors). All in all, the program provides a notably intuitive way of arranging different types of media in time and play space.

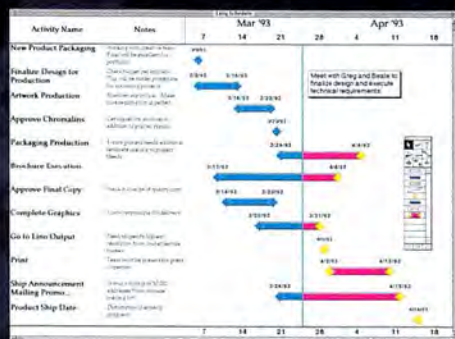
The program provides several basic editing tools. For QuickTime movies, you get standard Cut, Copy, and Paste commands, which you can apply to a single frame, a range of frames, or an entire movie. For PICT images, a simple Clipboard-style window provides Cut, Copy, and Paste functions. For text, you can create standard and bullet-style text within Producer or import text from external applications. By far the most-robust editing tools are in the MIDI Editor, which provides controls for stereo panning, volume, transposition, MIDI channels, and instrument editing. However, you'll still need a separate MIDI sequencer to do acceptable event-level editing.

Producer also gives you the option of setting specific data categories and cue elements to



Passport Producer's Cue Sheet, which works much like an on-screen multitrack mixer, helps you assemble and synchronize a variety of media elements — including QuickTime movies and audio selections — into a multimedia presentation.

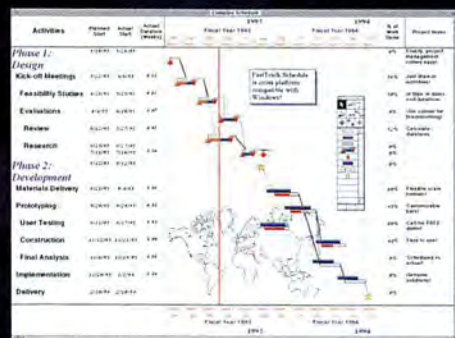
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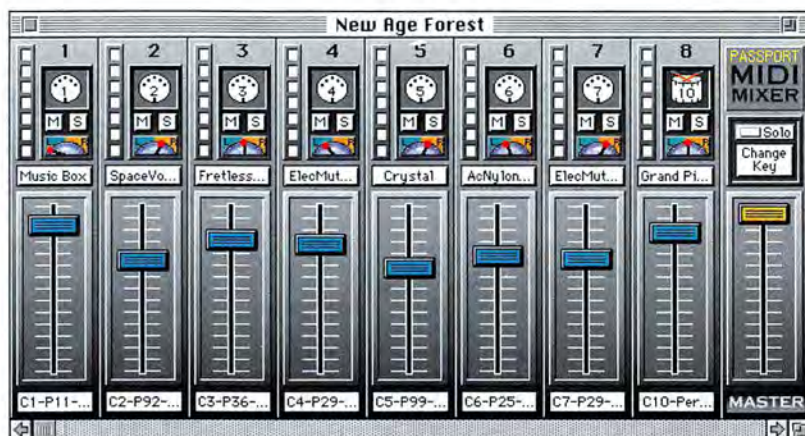
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Passport Producer is the only multimedia-presentation software that incorporates direct MIDI support. Its MIDI Mixer includes controls for volume, stereo panning, and channels. The Change Key button even lets you transpose selections into different keys.

work with other digital-video-editing programs — for example, you can specify Adobe Premiere as the universal QuickTime editor. To make the editing process as seamless as possible, Producer lets you launch external editing applications from directly within the program (RAM permitting).

To assist you in the process of organizing your presentation, Producer provides marker cues that can mark different sections within a Cue Sheet. It lets you play a presentation as you build it, so you can press the Tab key as the presentation runs and the program automatically inserts a marker in the Cue Sheet at that point. As you build a presentation, you can replace the markers with any media file.

Live Performance

The ability to lock the program to external devices such as video decks or MIDI synthesizers, start a paused presentation with a MIDI command, and control multiple monitors makes Producer an attractive option for live performance work.

Despite the program's strengths, however, we can't recommend it in its current iteration. During our tests on a Quadra 950, Producer sometimes refused to launch. When we did get it running, we experienced several crashes. This instability could be a serious liability if you were giving a live performance.

In addition, although the program lets you move a foreground object into the background, it provides no explicit commands for easily moving elements one

layer at a time. Another drawback is its inability to save groups of cues — a serious deficiency when you're working with large, complicated sets of elements. Fortunately, you can Shift-select and move multiple cues simultaneously.

We also ran into trouble when trying to overlap QuickTime movies. Producer can't seem to decide which movie to draw to the screen in the overlap area — we got bizarre, undesirable visual effects. And although you can use several transition effects with PICT images and text, QuickTime movies simply pop onto the screen with no transition options. Anti-aliased text is also not supported.

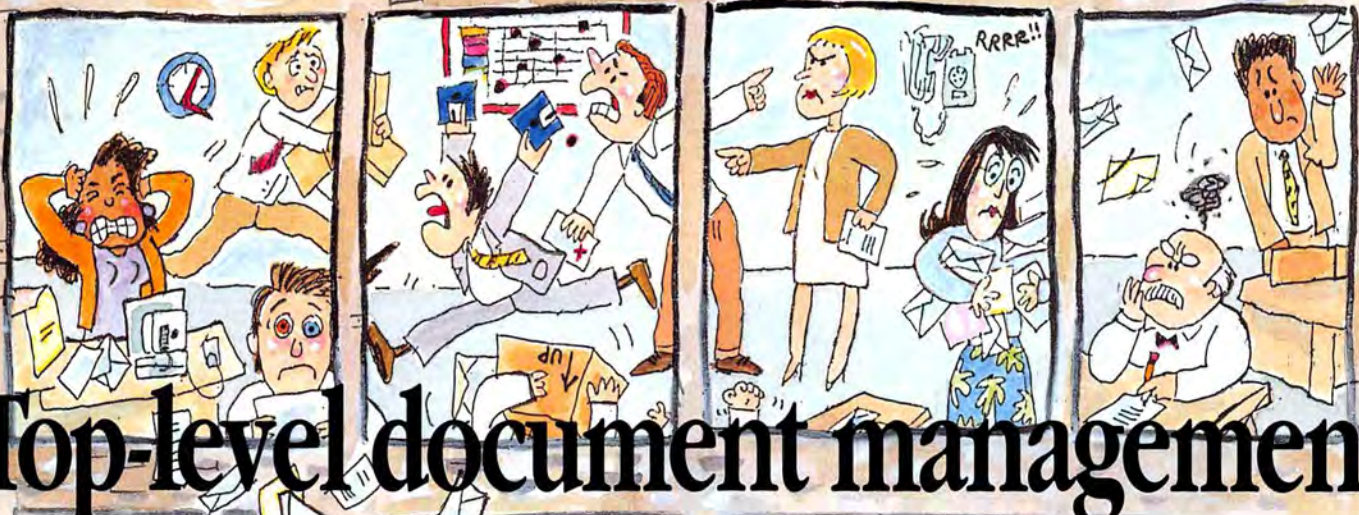
The Bottom Line

Passport Producer's very accessible, straightforward approach to the problem of media integration is impressive. By using the highly visual concept of the Cue Sheet, the program makes it easy to see how all the elements of a presentation — QuickTime movies, animation, sound, and graphics — are to come together over time. Moreover, its use of SMPTE time code ensures accurate synchronization of presentation elements. And as the only multimedia-presentation program with direct MIDI support, Producer should have special appeal to MIDI-savvy users.

But the flip side of Producer's innovative concept is its unreliable performance. Fortunately, as we were going to press, Passport Designs was putting the finishing touches on an update that should address this problem.

— David Biedny

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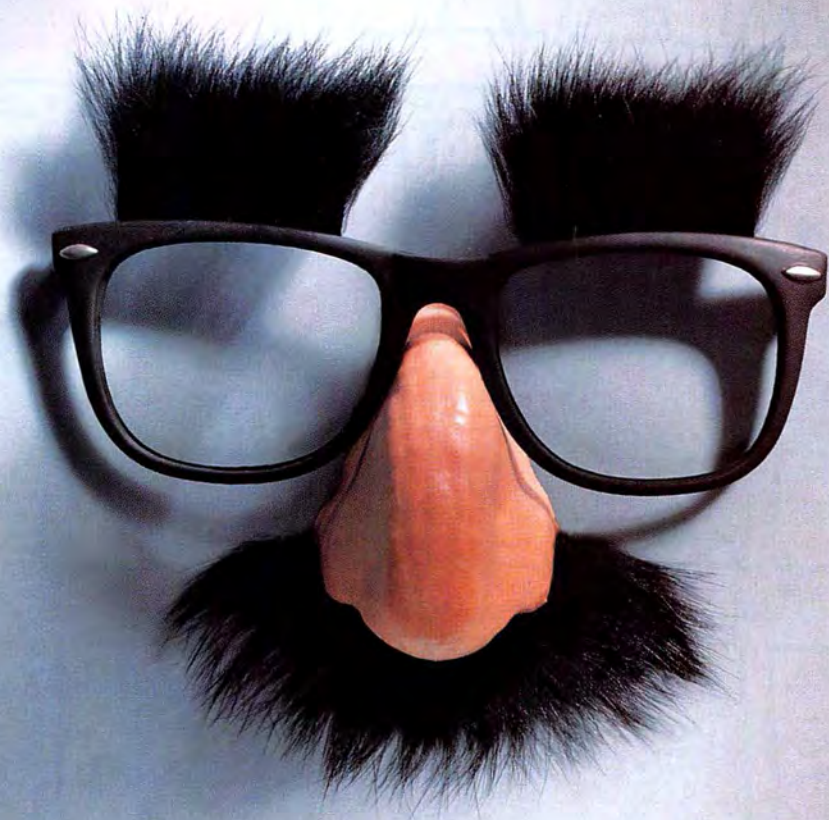


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PowerDraw 4.0

PowerDraw gains a multitude of talents with its newly added plug-in support.

With the release of PowerDraw 4.0, Engineered Software has significantly broadened the versatility of its 2-D-drafting tool. By incorporating support for external plug-ins, PowerDraw 4.0 gains access to the widest range of 2-D-drafting tools and capabilities available for the Mac. Although the program's somewhat frustrating interface and lack of support for publish-and-subscribe continue to be a disappointment, PowerDraw 4.0 stands out from the crowd as the best general-purpose drafting tool available for those CAD professionals who do not require 3-D-modeling capabilities.


Plugged In

By adding support for external plug-ins, PowerDraw can take advantage of precompiled routines that perform specialized tasks. Engineered Software includes a wide range of application-specific plug-ins for architectural design and mechanical drafting with the package. Users can choose from tool and tool-palette "externals" that load separately from the program.

Once loaded, PowerDraw's two tool externals, Draw By Center and Survey Dimension, are incorporated into the main tool palette. The Draw By Center tools work by anchoring object centers before you draw lines, rectangles, rounded rectangles, and ellipses. The Survey Dimension tool automatically dimensions polygons, lines, and other objects.

The tool palettes, which display as floating windows separate from the program's main tool palette, include Parametric Symbol, Arc Tools, Mechanical Tools, 3-D Tools, Architectural Tools, and Pixel Palette.

The Mechanical Tools palette is chock-full of tools for use in mechanical drafting and



PowerDraw 4.0
Published by: Engineered Software, 615 Guilford-Jamestown Road, Greensboro, NC 27409; 919-299-4843.
List Price: \$795.

design, including the Centerline tool; a tool for adding S-breaks to shafts, pipes, and other cylindrical items; the Drilled Hole tool; and tools for drawing hexagonal nuts and bolts. The 3-D Tools palette lets you enhance drawings by creating objects in perspective. Among the highlights of the Architectural Tools palette are intelligent insertion tools that cut and heal walls automatically as you place doors and windows.

To enhance architectural and engineering drawings with photographic or scanned images, you can use PowerDraw's Pixel Palette, which provides basic painting tools for creating and editing bit-mapped objects.

A variety of plug-ins is also available at extra cost. The \$295 PowerDraw Translator external, for example, lets you

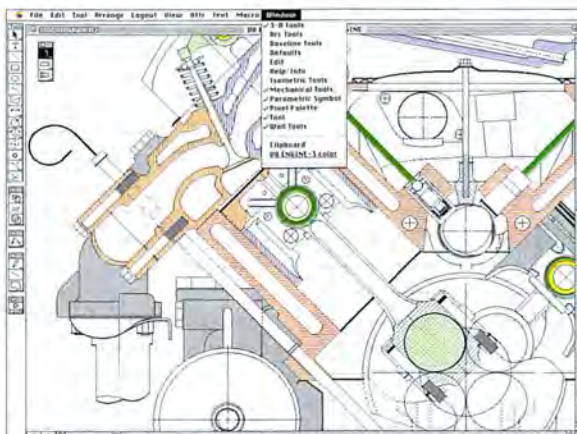
import and export files in DXF and EPS formats as well as import HP-GL files. Once loaded into the program's externals folder, Translator is added to PowerDraw's Open and Save menus. For those interested in MacDraw, Claris CAD, and PICT translations, a \$295 PowerDraw Translator stand-alone application is available separately.

Also worth mentioning is Advanced Drafting Tools. This two-volume set of plug-ins, priced at \$79 for each volume, is published and distributed by Engineered Software. The set offers users dozens of useful features, including isometric drawing aids, enhanced laser printing, and a projection-line tool that makes it easy to create multiview drawings by extending construction lines from one view to another.

Developer's Kit

In addition to the optional externals and those included with the PowerDraw package, Engineered Software is offering Inside PowerDraw, a developer's kit that provides complete, documented access to the program's internal data structure. The kit should be a boon for third-party developers interested in programming their own PowerDraw plug-ins.

PowerDraw has long offered a Pascal-based programming language, but we expect most programmers to begin migrating to the more comprehensive externals environment. Still, several powerful macro-based systems that extend PowerDraw are available from third-party sources. One of the most noteworthy is the M-CAM system, from MYCAM Software. Teamed with PowerDraw, the M-CAM system generates Toolpath routines from PowerDraw drawings that drive CNC (computer numerically controlled) milling machines, lathes, and other machinery.



The big news with PowerDraw 4.0 is the 2-D-drafting package's support for external plug-ins, which broadens its talents for specialized tasks. Checked in the Window menu shown here are some of the plug-ins included with the package.

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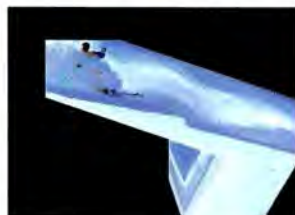
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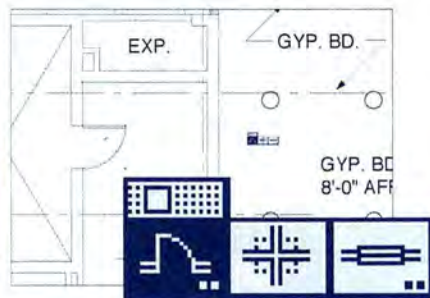
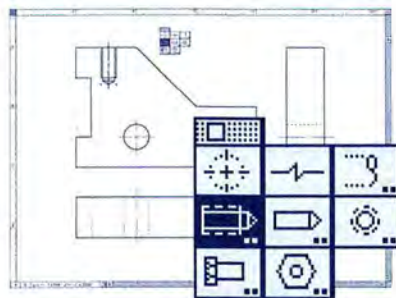
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CIRCLE 29 ON READER SERVICE CARD.

76 May 1993 MacUser



Among PowerDraw's plug-ins are the Mechanical Tools palette, which includes tools for drilling holes and drawing hex bolts (left), and the Architectural Tools palette, which has intelligent insertion tools for placing doors and windows (right).

There's More

Although externals support is the big news with PowerDraw 4.0, several other enhancements bear mentioning. The new Edit All Layers feature lets you select and edit objects on layers that aren't currently active as well as on the active layer. The one drawback of this feature, however, is that when you select an object, PowerDraw doesn't display its layer name, which makes the process of editing multilayer objects somewhat of a guessing game.

Version 4.0 also converts TrueType fonts to Bézier outlines, so you can resize, fill, stretch, and plot them to enhance your drawings. With the new Axis Align feature, you can align an object horizontally or vertically with points on another object. In addition, the improved Symbol tool lets you flip, rotate, and move symbols as you place them, eliminating the need to save a variety of symbol orientations in the library.

Standard PowerDraw features include 2-D geometric tools, dynamic object snapping, and a variety of dimensioning commands. For precise placement of objects, PowerDraw provides automatic object snapping for locating endpoints, centers, vertices, intersections, and tangents. Conventional grid snapping is also available. For creating complex geometries, PowerDraw provides Boolean operators that can clip, combine, and cut multiple objects.

Other noteworthy carryovers from the prior version include support for metric and English units and a built-in plotter driver that supports most popular HP-GL and DMPL plotters.

Although Engineered Software has done some serious tinkering under the PowerDraw hood, the package's interface has changed very little with version 4.0. This is disappointing, because

PowerDraw's interface comes up short in several areas. The package's zoom controls are implemented as menu commands. A better solution would be to use the conventional magnifying-glass icon. Another interface problem hampers dimensioning — you can set dimension preferences, such as arrowheads and tolerances, prior to creating them, but you can't edit them on the fly.

What's most frustrating, however, is that PowerDraw 4.0, like all other Mac CAD programs to date, doesn't provide support for System 7's publish-and-subscribe. With publish-and-subscribe support, PowerDraw users would be able to link drawings to external spreadsheets and databases as well as update symbols in drawings by editing a published master symbol.

PowerDraw's manual is thick but not very helpful. Many basic explanations are missing, and no tutorial is provided. We strongly advise new users to purchase the \$65 PowerDraw tutorial from A & E Computer Solutions. An in-box order card for the tutorial is included with PowerDraw.

The Bottom Line

Its interface shortcomings aside, PowerDraw 4.0 is a drafting powerhouse that's equally at home with architectural and mechanical drawing. The addition of support for external plug-ins opens the door to a broad range of tools — available from Engineered Software as well as from third-party developers — for specialized tasks. When compared with other popular 2-D-CAD programs such as Claris CAD, Graphsoft's Blueprint, and Autodesk's Generic CADD, PowerDraw is the only one to offer this kind of extensibility as well as a programming interface.

— James K. Anders

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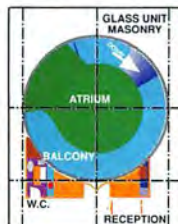
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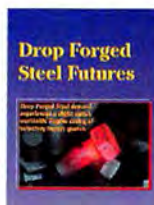
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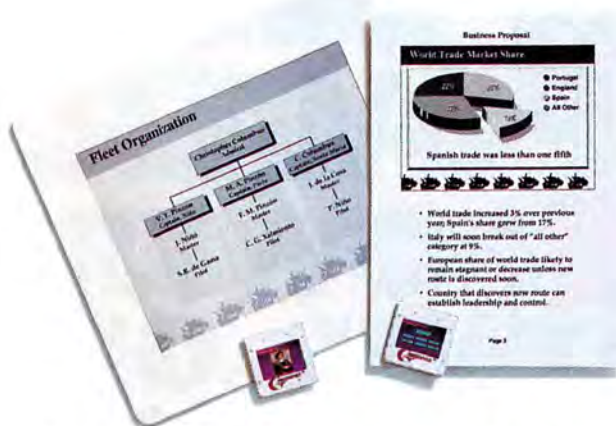
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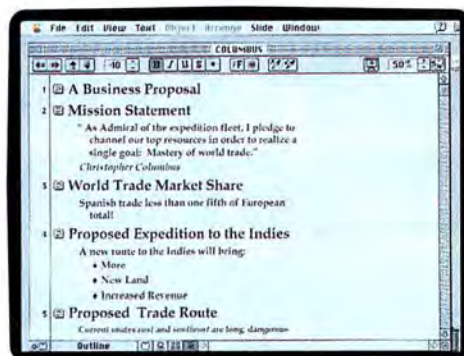
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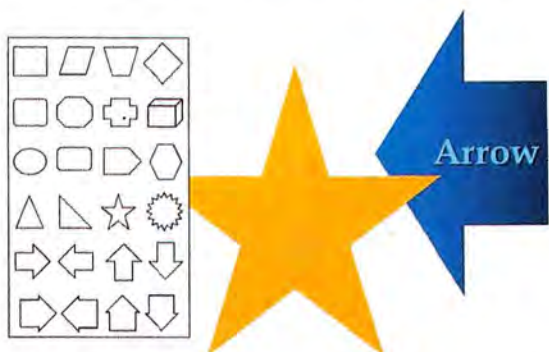
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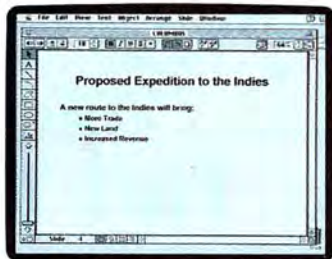
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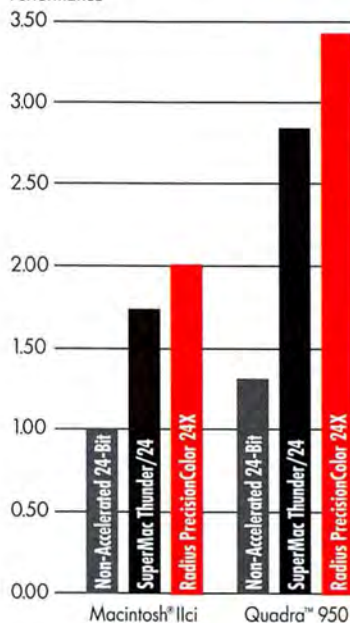
That's surprising, especially since the makers of Thunder/24 want you to pay \$1,250 more for their card.

PrecisionColor 24X isn't just faster and less expensive. It's also available in 7" and 9" versions. So it will fit in all of Apple's newly-announced systems, as well as current models.

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FILE & DISK MANAGEMENT

Public Utilities

The vigilant Public Utilities flags disk-corruption problems before they crash your disk.

If Fifth Generation's new disk-utilities package had a motto, it would surely be, "An ounce of prevention is worth a pound of cure." This strategy pays off big in the area of disk maintenance, as anyone who has lost data to a hard-disk crash will attest. By performing automatic preventive disk scans, Public Utilities is the first disk-protection program to flag problems before they take a toll in lost data. In addition, the program provides capable disk-repair facilities that fix most data-structure-related problems.

Going Public

Geared to novice users, Public Utilities is simpler in scope and operation than heavyweight disk-maintenance packages such as Norton Utilities and MacTools. The Public Utilities application comes with a standard complement of disk-utility functions — it scans and, if necessary, repairs disks with directory or other non-hardware-related problems; it provides facilities for extracting text from corrupted files and for undeleting inadvertently erased files; and it includes a disk optimizer.

The real beauty of Public Utilities, however, is the software's innovative Prevention control panel. Once installed, the control panel performs several important disk-maintenance functions automatically and unobtrusively. As well as storing the disk and file information it requires for successful file recovery,



Public Utilities 1.0
Published by: Fifth Generation Systems, Inc., 10049 N. Reiger Road, Baton Rouge, LA 70809; 504-291-7221.
List Price: \$149.

Prevention regularly scans disk directories for problems. When it finds one, it alerts you with a dialog box. By clicking on the OK button in the dialog box, you can set the software to the task of repairing your disk.

You can configure the Prevention control panel to work in a variety of ways. You can set it to scan the disk for errors at startup, at shutdown, or after a user-defined idle period. Most serious disk problems are the result of cumulative damage, so regular disk scans are a must. Having Prevention do automatic background scanning during idle time is the most effective way we've seen to date to ensure that disk checks occur on a regular basis. By contrast, preventive disk maintenance with Norton Utilities requires you to launch a separate disk-scanning program manually and wait while it checks the disk — a chore that too many users put off until it's too late.

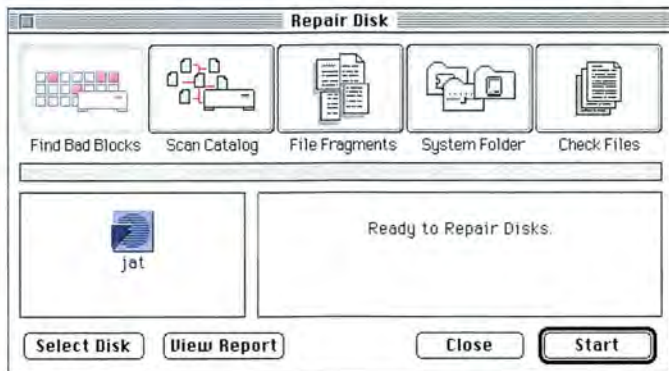
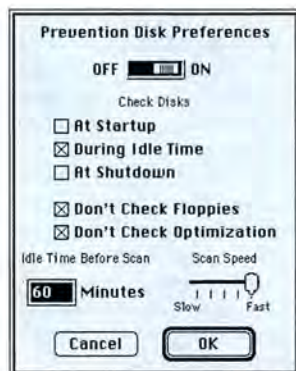
Public Utilities' main application window provides access to the program's Repair Disk, Repair File, Undelete File, and Optimize Disk facilities.

Repair Disk lets you scan and, if necessary, repair local volumes, including floppies and removable media. You can configure Repair Disk to either prompt you before it goes about its business or to perform repairs automatically. Repair File then attempts to recover text from your damaged files.

Undelete File recovers files you've thrown into the Trash, even after you've emptied the Trash under System 7. If you installed the Prevention control panel before you accidentally deleted your files, chances are good that Public Utilities will be able to recover the files. Even without Prevention, however, Public Utilities may still be able to recover them.

Public Utilities lets you specify the files you want to recover, using standard criteria such as name and modification date. You can also choose a destination volume and folder for the recovered files. A nice touch is that both the Repair File and the Undelete File facilities let you view the contents of files before you recover them, so you always know exactly what you're getting. This feature is particularly handy when you're recovering text files.

As with the Prevention control panel, you can configure Public Utilities' Optimize Disk facility to suit your specific needs. You can choose to have it bypass the bad-blocks check during optimization, for example, as well as set the percentage of fragmented files that triggers



Public Utilities' Prevention control panel (left) can automatically scan for disk-corruption problems during idle time. The package's thorough Repair Disk facility (right) can find and fix most problems related to data structure.

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an optimization recommendation. By defragmenting files and moving them toward the beginning of a volume, the optimizer creates more contiguous free space on a volume. Unlike Norton Utilities, however, it doesn't prioritize by putting infrequently used files closer to the beginning of a volume.

Advanced Features

Even power users can benefit from **Public Utilities**' preventive scans. To entice such users, the program provides an Expert menu, which has advanced selections for formatting floppy disks that have bad blocks; rebuilding the desktop; and performing scans of individual files to check file- and folder-modification information, file bundle bits, and resource-file integrity.

Also in the package is **Launch Pad**, a file-management utility that offers an alternative to the Finder's hierarchical file system. **Launch Pad** displays a palette that can contain your most frequently used applications, documents, and folders. By double-clicking on an item you've installed in the palette, you can launch it without wading through several layers of files and folders in the Finder.

Public Utilities' documentation is a big plus for nontechnical users. It provides a clear explanation of each disk-maintenance utility as well as lots of helpful background information on disk functions and malfunctions. A troubleshooting guide details common disk-related problems.

The Bottom Line

If you don't need a full-blown disk-maintenance package, **Public Utilities** is an excellent buy, particularly if you're looking for the most convenient way to monitor the health of your hard disk. By design, **Public Utilities** focuses squarely on disk maintenance. You won't find a backup utility or a virus-detection program tossed into the package, as you do with Norton Utilities and MacTools. **Public Utilities** features solid disk-repair and data-recovery tools. In addition, the program's Prevention control panel vastly increases the chances of catching disk problems early on, before a crash occurs. If you're a nontechnical user, **Public Utilities** is your best buy for data protection and recovery. If you're a power user, even you can benefit from the program's ounce of Prevention.

— Stephan Somogyi



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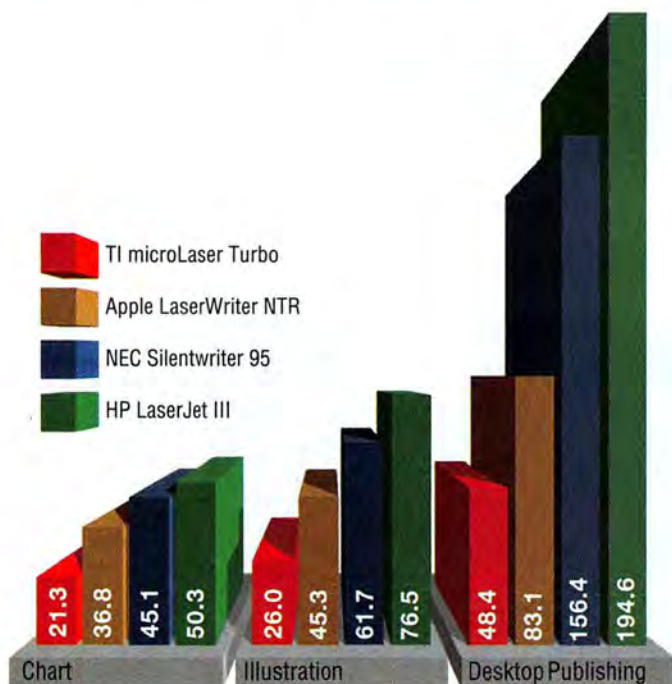
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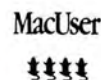


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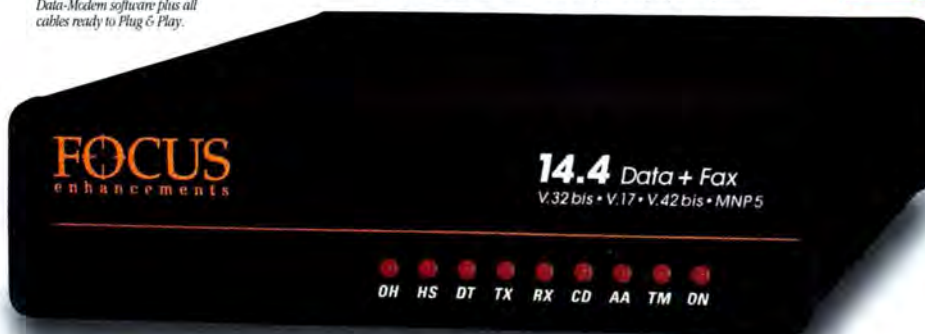
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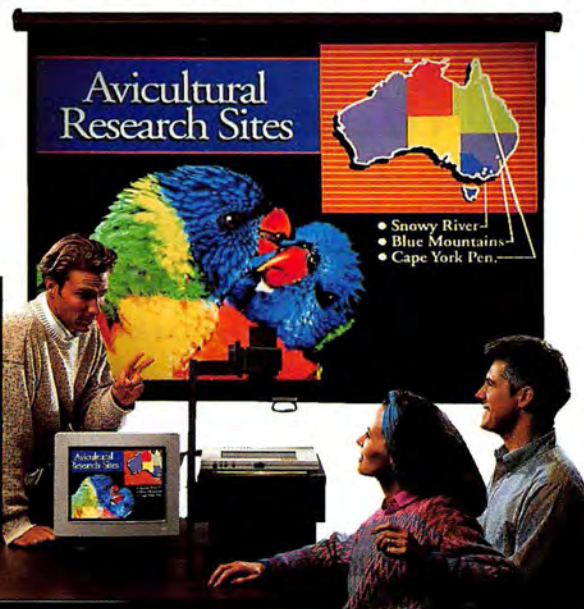
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Spiral



If you've secretly yearned for the computer equivalent of a three-ring binder to organize your information, check out Spiral. Although its name might suggest otherwise, this "RAM-resident notebook" is not ideal for quick note taking. If you have time to organize your information later, however, Spiral's easy, effective options for moving around in its notebooks make retrieval a pleasure.

Notebook setup is easy in Spiral, but you need to specify several elements. You create a notebook in one of three sizes, the largest being the size of a PowerBook screen. Then you divide your notebook into sections with tables of contents you can click on to navigate; tabs sticking out from pages display section names. To list something in a table of contents, you just select it in the text and use the Add to Section Contents command.

Entering information is somewhat impeded, because you can work with only a single page at a time; text doesn't scroll. When you add information to the middle of a page, text can get pushed onto another, newly created page; if you delete the new material, the information doesn't get threaded back onto the current page. This limitation isn't a problem when you're reading, but it's bothersome when you're actively taking notes and have to stop to create a new page.

Once you've entered your information, Spiral gives you plenty of ways to find things quickly. You can add bookmarks or mark a page by turning down its corner. A navigation palette shows — all in one simple bar — the overall notebook, its sections and their relative sizes, and the positions of marked pages. The palette lets you move quickly from place to place with a few clicks, but the controls would be more comfortable if they were worked into the main notebook window.

Spiral's wealth of options includes full text formatting, a simple calculation function, a good Find command, a PowerBook battery-charge readout, and the ability to paste graphics onto a page. There's even an abbreviation option that expands shorthand typing into full words or phrases.

In most cases, Spiral supplies unique options that are better for after-the-fact organization than for on-the-fly input. It's

terrific for presenting relatively static information and would be great as an on-line help system for any project or procedure — especially if TechWorks added a reader utility so you could share your notebooks easily with others.

TechWorks, 4030 Braker Lane W., Suite 350, Austin, TX 78759; 512-794-8533. Version 1.0. \$129.

— Sharon Zardetto Aker



Guaranteed Undelete



A name like Guaranteed Undelete can be hard to live down if it doesn't prove accurate. Fortunately, Utilitron's program walks its talk; using an inventive trick, it recovers deleted files better than Symantec's Norton Utilities for the Macintosh or Central Point Software's MacTools do.

When it empties the Trash, Guaranteed Undelete moves deleted files into an invisible folder on the disk and fools the Finder into excluding the contents of that folder when it calculates used disk space. Pressing the Command key turns the Empty Trash command into Recover Trash; a hierarchical menu displays the deleted files and folders on which you can click to restore them.

Guaranteed Undelete's cleverest trick is how it reuses the "vacant" disk space that's occupied by the files in the invisible folder; it does so in the order in which the files were trashed. This method guarantees that the most-recently-trashed files are the most accessible — unlike the case with Norton Utilities or MacTools. Those utilities reuse vacant disk space randomly. They may successfully recover a three-week-old file while failing on one deleted ten minutes ago.

The Guaranteed Undelete control panel also includes TrashMaster (see review, September '92, page 95). TrashMaster lets you empty the Trash selectively, set up filters that automatically delete files with various characteristics, and trigger deletion to occur after specific events. TrashMaster's Incinerate filters securely delete files by overwriting the occupied disk sectors (with optional triple overwriting to meet Department of Defense standards), so that incinerated files are unrecoverable with standard disk-recovery software. As with emptying the Trash, you can incinerate files selectively and set automatic filters for incineration.

We gave TrashMaster only three mice in September '92. It had no operational flaws, but we believed that it provided far more trash control than most users ever need, at the expense of complicating the simple Empty Trash command. Now that TrashMaster is in the Guaranteed Undelete package, however, that trade-off becomes far more worthwhile.

Utilitron, P.O. Box 811, Allen, TX 75002; 800-428-8766 or 214-727-2329. Version 2.0. \$79.95. Upgrade from TrashMaster, \$20.00.

— Darryl Lewis



Who Killed Sam Rupert?



Grainy black-and-white newspaper photos and a clacking typewriter set the tone of Who Killed Sam Rupert?, a CD-ROM whodunnit from Creative Multimedia Corp. The first in CMC's Virtual Murder series, this interactive murder mystery draws on QuickTime videos, animation, sound, and graphics to tell a tale of greed, lust, and anger — all the usual ingredients of a good murder.

Sam Rupert has been murdered and left to ferment in his upscale restaurant's wine cellar. When you enter the case as a detective, you listen to your assistant Lucie's initial report and then take over. You can click on different objects to view the results of fingerprinting, serological analysis, luminol testing, and other forensic goodies. Other resources include blueprints of the restaurant, the restaurant's reservation book, and a guide to vintage wines. You can view Lucie's videotaped interviews with eight suspects and record notes in your investigation notebook.

Each task you undertake ticks time off the clock — and you've got only six hours to crack the case. When you think you know the answer, you have to answer seven out of ten questions correctly at a press conference. If successful, you interview three suspects more closely before filling out an arrest warrant; if you fail, you resume your investigation after a good scolding from your superior.

Who Killed Sam Rupert? is entertaining and full of nice touches, but it's flawed by jerky video elements, poor sound quality, glacial seek times, and gluttony for memory. CMC says the program needs 3.5 megabytes of free RAM to run, but on a Mac IIfx loaded with 80 megabytes of

NEW ON THE MENU
QUICK CLICKS

RAM, it needed more than that — even after we'd turned off ATM and set the disk cache at minimum. We finally resorted to copying the application to the hard disk and upping its memory allotment to 35 megabytes (overkill, yes, but drastic measures were called for). Only *after* we'd finished the game did a screen appear to recommend this procedure.

But once we got it going, we had a great time. Who Killed Sam Rupert? has a rich, multilayered interface that's fun to explore even after you've solved the murder — which we did the first time out.

Creative Multimedia Corp., 514 N.W. 11th Avenue, Portland, OR 97209; 800-776-9277 or 503-452-5933. \$39.99.

— Pamela Pfiffner



SpeedyCD



Compared with hard-disk drives, even the best CD-ROM drives are incredibly slow. SpeedyCD is a control panel that

speeds access to Mac-specific CD-ROMs, making certain Finder operations respond as quickly as they would on your hard drive.

SpeedyCD pulls off this feat by creating an index of each CD-ROM's directory on your startup hard disk. When you navigate a CD-ROM in the Finder, SpeedyCD quickly grabs the necessary information from the index. Only when you request an actual file does SpeedyCD switch back to the real CD-ROM, opening the file at standard CD-ROM speeds.

SpeedyCD has a clean, unobtrusive interface. Whenever you insert a CD-ROM, a dialog box displays the amount of hard-disk space required to create an index for it. Depending on the number of files and folders, an index can take as much as a minute to compile, requiring anywhere from 50K to several megabytes of disk space. You have the option of creating the index or not, but indexes are deleted by default when you eject the CD-ROM, requiring a time-consuming rebuild the next time you insert it. You can specify

that SpeedyCD always create indexes without asking, and you can request that individual indexes not be deleted upon eject, but there's no way to change the default for all CD-ROMs.

By changing the indexes, you can create new folders, rename files and folders, move files and folders, change the views of windows, and delete files and folders. But you can't create a new file on a CD-ROM — after all, it's still *read-only*.

Overall, SpeedyCD delivers on its promise to dramatically increase Finder access times for CD-ROM drives, but we didn't find it that useful, because most CD-ROMs already come with their own browser utilities. SpeedyCD is compatible with Systems 6 and 7, but it works only with CD-ROMs that use the standard Mac HFS (hierarchical file system) format; it doesn't affect the speed of CD-ROMs that use cross-platform standards such as High Sierra or ISO 9660. If you have lots of HFS CD-ROMs that you regularly browse through by using the Finder, SpeedyCD makes sense. But for

WHEN COLOR CONSISTENCY

Original
Input



Printer
Output

most folks, the performance benefits are outweighed by the cost and by the time and space required to build and store the indexes.

ShirtPocket Software, Inc., P.O. Box 40666, Mesa, AZ 85274; 602-966-7667. Version 1.2.4. \$70.

— Owen W. Linzmayer



Spectator

1 1/2

If you need a good way to capture real-time screen activity in QuickTime movies for training materials or software demos, you may want a more active participant than Spectator.

Spectator's performance during the capture process leaves several things to be desired. To record screen activity, you need to have the Spectator application open in the background and the screen set to 8 bits or less — Spectator does a passable job of capturing 8 bits of color or less but chokes when capturing 24-bit screen

activity, even on a Quadra. The area of the screen to be captured is indicated by a bounding rectangle you can reposition and resize — but you can't set it to actively track the cursor as you can with the Follow Cursor option in CameraMan, Spectator's main competition. And when you're capturing activity, tools can be slow to respond — not just in complex graphics programs but in other programs as well. Occasionally we experienced long delays in responsiveness while recording more than five seconds of activity.

Spectator provides several features to help you add soundtracks to your movies (which you can save in standard QuickTime format or as self-contained movie files). You can record audio within the Spectator program or attach prerecorded audio files to working movies. There's also a nice feature that lets you record simulated mouse-key clicks and system beeps along with screen capture. Unfortunately, Spectator can't simultaneously capture any sampled sound during screen capture — you must add sound as a

postprocess while you view a captured movie. Another annoyance is the lack of an audio-levels gauge.

We found a couple of bugs in Spectator. Surprisingly, it allowed us to assign the same key combination to all three user-specifiable commands (for starting, pausing, and stopping recording) without a single warning message. Another repeatable problem reared up in System 6.0.7 when we were attempting to get to the QuickTime compression options from within the Save dialog box — the testing machine (a Macintosh IIfx) simply froze.

Although Spectator is not without nice touches — a helpful QuickTime explanation in the manual, for example, and the program's 30-day money-back guarantee — the lack of cursor tracking (combined with the other deficiencies we found) limits the program's overall usefulness.

Baseline Publishing, Inc., 1770 Moriah Woods Blvd., Suite 14, Memphis, TN 38117; 901-682-9676. Version 1.0. \$99.95.

— David Biedny

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CIRCLE 85 ON READER SERVICE CARD.



Norton's
ESSENTIAL
PERFORMANCE
Optimize 1 MB

InLine Sync
Apple Computer

CPU
CONNECTIX
POWERBOOK
UTILITIES

Traveling Companions: **PowerBook Utilities**

*Adopting a PowerBook
means handling problems
you never had before.
Can the new crop of
PowerBook utilities put
your mind at ease?*

a portable computer is no more a desktop machine that you carry under your arm than a mobile home is a house on four wheels. That may seem obvious, but hidden behind the obvious is a host of issues that pop up only when you start roving. When you're chained to a desk, you generally don't care how much power you're drawing or where the cursor is. But when your desk turns into an airplane lap tray, those issues, and a score of others, take on special importance.

Once a PowerBook becomes part of your life, you become obsessed with power — literally. Battery life, and the conundrum of using the battery and saving it at the same time, becomes your primary concern. Then there are all the minor daily annoyances — such as disappearing cursors, an overactive Caps

BY SHARON ZARDETTO AKER

PowerBook Utilities

Lock key, and having to roll a trackball instead of a mouse — that can leave you cursing the machine you've come to love so much.

We took a good look at four packages specifically targeted at PowerBook problems. Two — CPU (Connectix PowerBook Utilities), from Connectix, and Norton Essentials for PowerBook, from Symantec — are collections of PowerBook utilities; the other two — Inline Sync, from Inline Design, and PowerMerge, from Leader Technologies — are file-synchronization utilities. We also had a peek at several others that were about to be released (see the "Future Partners" sidebar). [We learned about two additional file-syncing utilities too close to press time for this review: ShuttlePilot, from Xanatech, and Synchronize!, from Qdea. Watch for a review of these products in an upcoming issue. — Ed.]

Separate Utilities

There are significant differences in how CPU and Norton Essentials for PowerBook approach battery concerns and in what additional functions each program provides. They seem to share a common interface (control-panel adjustments and a system menu), but the similarity is strictly superficial.

CPU is a single control

panel. Its menu-bar title is a battery icon that indicates the battery state, accompanied by your choice of time, date, current CPU clock speed, and estimated time remaining and/or percentage of battery charge remaining. The menu includes a Sleep command, access to the CPU control panel, and a list of the "sets" you've made to conserve battery power (see Figure 1).

Norton Essentials installs a control panel with an alias in the Extensions folder and a folder of its 12 modules in the Control Panels folder. Its menu-bar title is simply the program icon; the default setup adds a second menu and three of six other possible menu-bar icons. In all, Essentials looks like software created by a committee.

The menu itself is poorly organized. The first command lets you access the Essentials control panel, beneath which a section of strange-looking, small icons

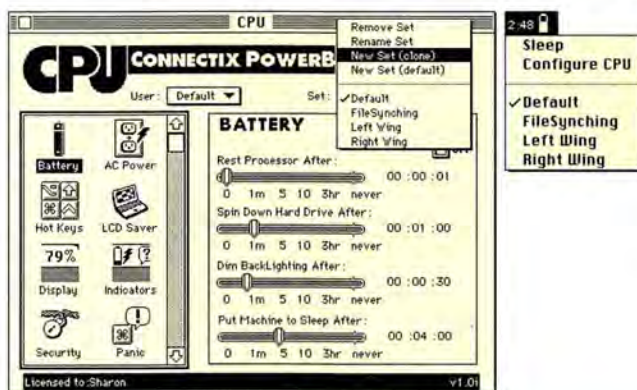
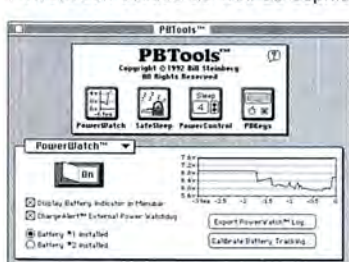


Figure 1: CPU lets you create sets of power-saving settings that you can choose from, depending on your situation. Sets are reflected on CPU's menu, shown at the right of the control panel here. (On this menu, *Right Wing* is a conservative setting for power; *Left Wing* is much more liberal.)

Future Partners

By the time you read this, at least two more PowerBook utilities packages and another file-syncing program will have entered the fray. We had a chance to look at the beta versions of the utilities packages, Inline Design's PBTools and ALSoft's UP (Utilities for the PowerBook), and saw a demo of FileRunner, from MBS Technologies. (At press time, Claris purchased ALSoft's UP and renamed it Power to Go. Claris will publish the utility under the Claris Clear Choice label.)

PBTools is a compact control panel that offers basic PowerBook utilities as well as sophisticated battery analysis.

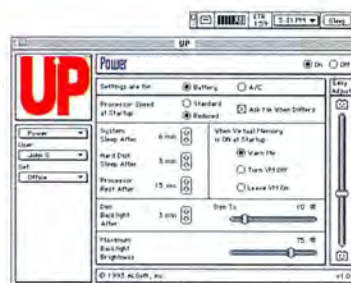


Inline Design's PBTools offers enough battery information for even the most radical wirehead.

You can set one combination of system-sleep, drive-sleep, and backlight-dimming intervals for when you're running on battery power and another for when you're plugged in. You get keyboard commands for drive spindown and system sleep, and you get an asynchronous-drive wakeup

that lets you keep working while your drive is coming up to speed. PBTools also provides thick-en-cursor and find-cursor options; key remapping so the Control and arrow keys can substitute for the Home, End, Page Up, and Page Down keys on an extended keyboard; Caps Lock control; and basic password protection for startup and wakeup.

What sets PBTools apart from the competition is its battery analysis. Besides the standard menu-bar icon indicating the state of your battery, you get information guaranteed to keep even the most dedicated wirehead happy. There's a graph of your battery voltage over time — two to four days'



ALSoft's Utilities for the PowerBook (recently bought by Claris and renamed Power to Go) uses a single panel for its controls and includes the handy PowerBar (top), which displays estimates of your battery's charge level and the estimated time remaining (ETR).

*essentials
installs a control
panel with an alias
in the Extensions
folder and a 12-
module folder in the
Control Panels
folder. It looks like
it was created by
a committee.*

modules you're most likely to use while you're working in an application, although three of those menus have only a single command in their submenus (see Figure 2). An advantage of Norton's approach, however, is that it allows you to extend the program by dropping new modules into its folder.

Power Saving

CPU's approach to battery management is to let you define a "set," a specific combination of intervals for spinning down the hard disk, dimming the screen, resting

indicate the various module settings. (The words *AppleTalk On* with a check mark, for example, would be easier to understand than the two little kissing connector icons.) Luckily, this section of the menu is modifiable, so you can choose whether or not to display the indicators. Then comes more evidence of Essentials' modular approach: Half a dozen hierarchical menus let you directly access the

the processor, and putting the system to sleep. You define two combinations for each set — one for when you're on battery power and the other for when you're plugged in. To switch sets, you simply select the one you want from the CPU menu. The utility also provides keyboard commands for instant spindown, backlight control, and sleep.

Norton Essentials lets you define power-saving combinations as well, but in a different way. You set intervals for spindown, processor rest, and sleep for each of three conditions: A/C power, battery, and low battery (you can choose the threshold for just what "low" is). You can even define combinations to be used when specific applications are running. (With a RAM-based application, for instance, you'd want the hard disk to spin down immediately after launch; with an application that's disk-intensive, you wouldn't want to spin the disk down immediately after launching the application, because you'd only be spinning it right back up again when you started work, wasting a lot of power in the process.) Essentials automatically switches you to the correct set for the application you're using (see Figure 3). It also provides separate keyboard commands for each of the power-saving features.

Which approach is better? Essentials' three-pronged approach of battery, low battery, and power is a nice touch, as are its application-specific sets. But CPU's approach and its menu access to sets are more convenient when you have to allocate your power based on your situation (a long plane ride versus availability of an

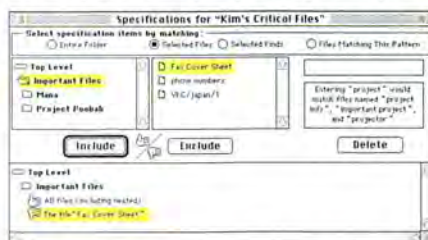
worth of data, based on checks made at one-minute intervals — and an exportable log with more-detailed information. PBTools even lets you track two batteries simultaneously.

ALSoft's Utilities for the PowerBook is a collection of modules that you access through a single control panel. Like the other PowerBook-utilities packages, it lets you make sets of power-saving combinations that you can invoke when you need them. It also includes a slider control that lets you balance power usage against performance without making you specify individual settings for spindown, sleep, and so on. UP's PowerBar is a small floating window that displays battery information, including an estimate of time remaining. The utility includes airport and screen-saving modules of questionable usefulness, but there's also a "sticky" menu module that keeps a menu dropped down, enabling you to select a command without keeping a trackball button pressed. And UP has a unique and clever approach to the disappearing cursor: The utility not only gives you a keyboard command that finds the current location of the cursor but it also provides an automatic Find that kicks in when

you've moved the cursor too far or too fast.

We were unable to get a beta version of the FileRunner file-syncing utility in time to give it a workout, but MBS gave us an impressive demo. If FileRunner is as good as it looks, it'll be a winner. It can coordinate files among any number of machines — work, home, and PowerBook, for instance — or from many PowerBooks back to one office network. Although you can synchronize files when the machines are connected on a network, FileRunner is also set up for using a floppy disk — the Runner disk — as the transfer medium, automatically compressing and expanding files for this procedure.

FileRunner provides all the features that you need in a file-synchronization program, letting you specify where your folders and files are on each machine and letting you include or exclude certain items within the targeted folders. It also warns you when a file has been changed in more than one place since the last update and provides a Viewer, which shows the text of word-processor documents, enabling you to compare versions without opening the parent application.



MBS Technologies' FileRunner may be the best file synchronizer around. Its interface for selecting files is clear and simple.

PowerBook Utilities

Instant Access
lets you control
AppleTalk; it
provides convenient
keyboard commands
for toggling
AppleTalk on
and off. It also
allows for network
monitoring.

packages have in common? They both supply a cursor finder and a choice of thick text cursors for use with screens where the cursor disappears when you move it too quickly (LCD screens, for example); both also provide a hard-disk spinup indicator and include basic password security for startup and wakeup.

Because the PowerBooks' Caps Lock key feels just like any other key on the keyboard, it's easy to turn it on by mistake. CPU lets you turn Caps Lock off so it doesn't lock when you press the key by mistake, which is a slight help. Essentials, however, does it right: It lets you control the Caps Lock key by defining a double-press Caps Lock or Option-Caps Lock to turn Caps Lock on. Essentials also lets you replace the standard pointer and cross-hair cursor with versions that are easier to see and gives you cute — but unnecessary — alternatives to the watch and plus cursors.

Separate and Unequal

What, exactly, sets the packages apart? Many tiny details differentiate one from the other, but you'll also find some major differences in functionality.

On the CPU side of the ledger, there's keyboard power. If rolling the ball on your trackball while holding down one of its buttons feels about as natural as rubbing your belly while patting your head, you'll appreciate CPU's menu and dialog-box controls — you can do everything from the keyboard if you want to. CPU also has a quick-discharge option that you can use for properly reconditioning your

outlet within the next hour) rather than on your application — and you *can* make an "application-specific" set, although unlike with Essentials, this requires a bit of a workaround. CPU includes backlight dimming (backlighting is a major power drain) in its sets; Essentials' backlight dimming is a separate control.

Solutions in Common

What else do these

NiCad battery (see "Taking Charge: Powerbook-Battery Management," February '93, page 194).

By actual count, Norton's Essentials has four items that CPU lacks; but if you consider only the useful things, the number drops to two. What's left out of the count? First, the Airport Shut Down module, which is supposed to save you time when a security person wants you to prove that your PowerBook isn't a terrorist device. (Don't bother using it: Travel with your PowerBook in Sleep mode so you can wake it up instantly, or hold down the Shift key to bypass your extensions when the wary security person asks you to start it up.) The second useless item, Quick Notes, is a simple control-panel note taker: You can have as many as 32 items with 32-character titles and 64-character descriptions — all in an awkward, modal control panel. But on to the good stuff in Norton Essentials: Instant Access and SyncIt!

Instant Access gives you control over AppleTalk, providing convenient keyboard commands for toggling AppleTalk on and off. It also allows for network monitoring, so when you hook up to a network, Instant Access automatically turns on AppleTalk, and when you disconnect, it turns AppleTalk off. At three minutes (the default log-in time, which you can't change), the automatic turn-on is too slow and you'll end up using the keyboard command instead. But having AppleTalk turned off automatically is a great help, because it's easy to forget to do and because AppleTalk steals battery power. In order for all this to work, Essentials always loads AppleTalk into memory at startup, regardless of your setting in the Chooser; Instant Access then immediately turns it off again (if that's your setting). You lose 200K of system memory even if you never turn AppleTalk back on, but we think that's a small price to pay.

Finally, there's the SyncIt! module, which offers all the basics of file syncing. You'll be able to reconcile the

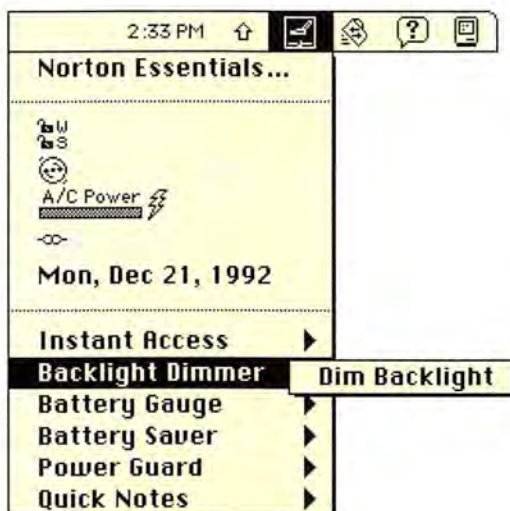
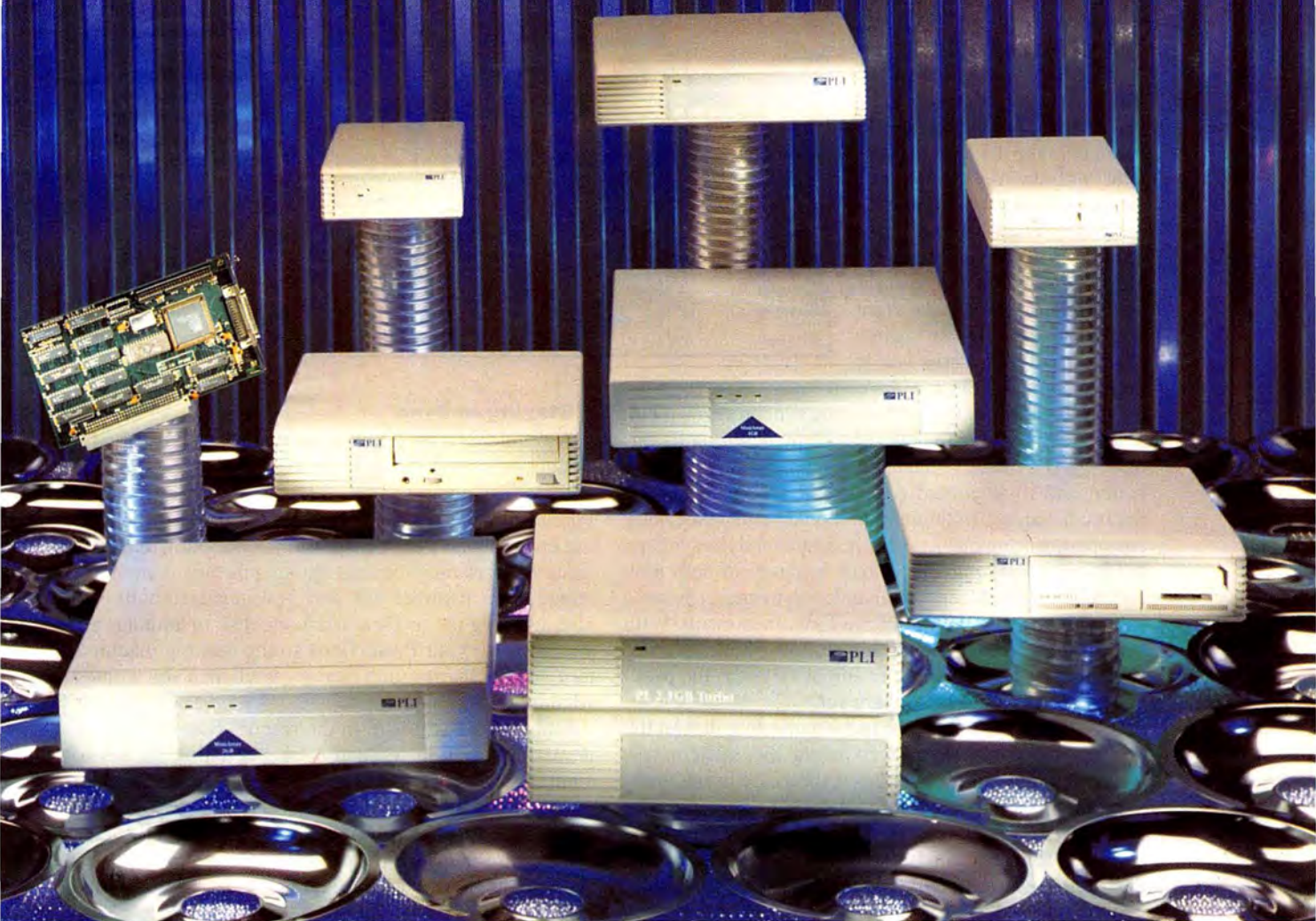


Figure 2: The Norton Essentials menu is more cluttered than it should be. The time readout and Caps Lock icon on the menu bar belong to Essentials, and the icon to the right of the menu is the SyncIt! menu icon. The mini-icons indicate various settings, none too clearly, and half of the hierarchical menus have only single-command submenus.

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PowerBook Utilities

files that exist on both your PowerBook and your desktop machine. After you specify a folder that's on both machines, SyncIt! gives you a list of the files in each folder and indicates which way they'd have to move to make the folders identical, with the most recent version of each document on both machines. You can remove any item from a list and even reverse the direction of the copy (if the older version is the copy you want to retain, for example). SyncIt! also warns you if both versions of the file have been changed since the last time you synchronized them.

Right now, CPU is a better choice than Norton Essentials. CPU's battery-management approach is a little better, and its keyboard controls are handy. Based on feature list alone, Essentials should be better, especially considering its unique AppleTalk control and file syncing, but its modular approach makes it messy in both look and feel — the Sleep command, for instance, is on a submenu near the bottom of the Essentials menu. With some polishing and better integration of its features, Essentials has the potential to surpass CPU as the package of choice, but it's not there yet.

(Essentials' initial release had a major bug that let the PowerBook go to sleep even while the modem was active. A quick follow-up release took care of the problem, but the version number remained 1.0. Unofficially officially, the bug-fixed version number is 1.0.1, but the only way to know which release you have is to look at the creation date of the file; if the time reads "1:01 AM," you've got the update.)

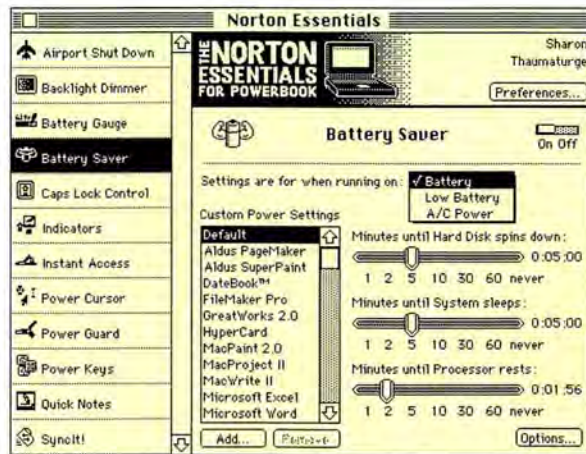


Figure 3: The Battery Saver module in the Norton Essentials control panel lets you choose one of three conditions from its pop-up menu. You can also define custom settings for specific applications.

Staying in Sync

As evidenced by Essential's SyncIt! module, the introduction of the PowerBook inadvertently added another term to our computing lexicon: *file syncing* (for *file synchronization*). It's difficult to keep track of files you use on both your PowerBook and your desktop machine; some files are more current on one machine than on the other, and sometimes you may have changed both files after copying the original from one disk to another. So, you hook up your PowerBook to the desktop machine, turn on File Sharing, and then . . . well, then you wonder what to do next.

File-syncing software to the rescue! Sort of. There's no perfect solution yet, and there's certainly no way to combine the changes made to a file on both machines into a single file — remember, changes may involve deletions as well as additions. Of the two full-blown syncing programs we reviewed, neither addresses every synchronization issue, but one is a clear winner in the current race.

Build Your Own Utilities Collection

You can assemble the perfect PowerBook utilities collection by combining CPU's power-saving sets and menu control, PBTools' battery analysis, and Norton Essentials' file syncing — or you can just roll your own from the freeware and shareware utilities available on-line.

For power conservation and information, you can choose from among at least three utilities. **My Battery**, a shareware application by Jeremy Kezer, provides a tiny window with lots of battery information: the current voltage, CPU speed, charge state, adapter-plug status, and an estimate of the time remaining on your battery charge. **CellMate**, freeware by Fred Hollander, puts a battery icon onto the menu bar and provides a menu with Restart, Shutdown, and Sleep commands. **PowerSleep**, from Urs Calibrán, Stefan Frey, and Alexis Gehrt, is an Fkey that puts your PowerBook to sleep, letting you bypass network dialog boxes.

For disk spindown, cursor retrieval, security, and other functions, there's even more to choose from. **SpinD** is an Fkey that lets you spin down the hard disk, and **SafeSleep** is an extension that gives your PowerBook password protection on wakeup. Both are freeware by Bill Steinberg, who wrote the commercial PBTools package. With **ToggleAT**, an Fkey by Jon Pugh, you can turn AppleTalk on and off from the keyboard instead of going through the Chooser. **Cursor Fixer**, a freeware extension from Dennis Brothers, replaces the standard text and cross-hair cursors with thicker versions that don't disappear. **CursorBeacon** is a control panel from Bill Monk that calls attention to a lost screen cursor. And **Zync** is a basic file-syncing utility; it's freeware from Ricardo Batista.

You can find all these utilities on ZiffNet/Mac as well as on other on-line services — except for CellMate and CursorBeacon, which are ZiffNet/Mac exclusives.

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Thunder/24 box pictured; Thunder II Light was not available.

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On-the-fly resolution switching	✓	✓	✓	✓
21" display support	✓	✓	✓	✓
G-World support	✓	✓	-	✓
Pan & Zoom	✓	✓	-	✓
Photoshop Acceleration	✓	✓	-	-
16-bit QuickTime mode	✓	-	✓	✓
Accelerates text	✓	✓	-	-
Text modes accelerated	8	6	-	-
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CIRCLE 130 ON READER SERVICE CARD.

PowerBook Utilities

We approached PowerMerge not expecting too much and got a pleasant surprise. It uses a funky collection of mini-icons, but once you get used to them, it's a breeze.

Inline Sync: Face-Lift Needed

Inline Sync has a lot of potential, but it needs an interface overhaul before that potential can be fully realized. The first problem shows up immediately: Run the program and select two drives, and your only choice is the Synchronize! button in the main dialog box. It sure feels as if you're going to copy one disk over the other. In fact,

when you click on the button, Sync simply reads both disks. That's the second problem: No matter how few files or folders you want to synchronize, Sync reads through the entire directories of both disks. And if it's the first time you've synced these two disks, you're led through a series of dialog boxes before you can get to work.

Sync's main window lets you view a directory in a variety of ways, showing, for instance, only linked items or only items that have changed since the last syncing. Several symbols are used to indicate a file's status: whether it's going to be copied to the other disk or be copied over, or if it exists on both disks and both versions have been changed. But you can view only one disk at a time. A pop-up window shows information about both versions of the file, but you're forced to move back and forth between directories too often when you're setting up your syncing structure. Say, for example, that a file is marked as having been changed on both your desktop computer and your PowerBook and you know that you can safely copy over the file on your PowerBook, because the change to it was unimportant. Your only commands, unfortunately, are Keep This Version and Keep Both Versions. You have to switch to the other directory list, for your desktop machine, find that same file, and use the Keep This Version command there (see Figure 4).

Sync's really intriguing feature is its scripting capability. With only a few verbs, "file classes"; and name, date, and type

clauses, you can construct scripts such as "Link all files in 'Project Folder' of type 'TEXT' less than three days old." It's a great idea, but the implementation is poor and the documentation is abysmal. For instance, you can't close an empty Script window — but if you close a window while it has a script in it, Sync runs the script. Luckily, the scripts only establish matches and links and don't activate file copying, so you have a chance to look in the File List window to check the results your script will have before anything else happens. You can save Sync scripts, but that seems to be a secret: It's not mentioned in the scripting documentation. To save a script, you have to turn that function on in a Preferences dialog box that refers only to a script pop-up menu. Even a call to Inline tech support resulted in the erroneous statement that scripts couldn't be saved.

PowerMerge: Simple Syncing

We expected to be impressed by Inline Sync and instead wound up being disappointed; we approached Leader Technology's PowerMerge not expecting too much and received a pleasant surprise.

Our low expectations were triggered by the general look of the program: PowerMerge uses a funky collection of mini-icons to represent the status of folders and files on the two disks. You'll probably never grow to like the icons, but you do get used to them quickly, and once you do, the program's a breeze.

PowerMerge's approach is straightforward. You choose a folder on each machine, and the utility creates a combined directory of all the subfolders and files in those folders. PowerMerge shows the folders in one panel; when you select a folder, a list of the combined files appears in the other panel. Here's where the icons come in: A square showing in an icon's left corner means that the file or folder exists on the left-hand computer; a square showing in the right corner means that it's on the right-hand computer, and squares showing in both corners mean that it exists in both places. Icons can be regular or reversed-out and are marked with pluses, Xs, or circles of various sizes to indicate how the

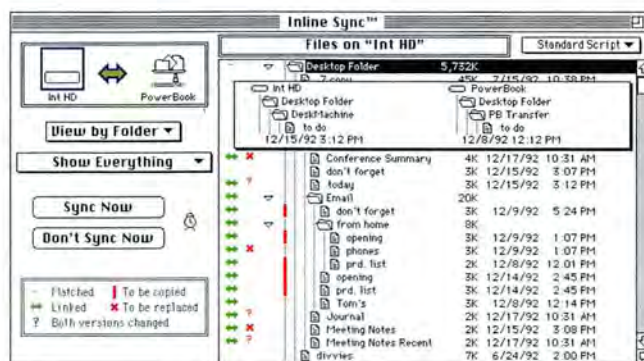


Figure 4: Inline Sync's File List window displays a directory for only one disk at a time. A pop-up window compares files that exist on both disks, but you have to move back and forth between directories to set up your syncing structure.

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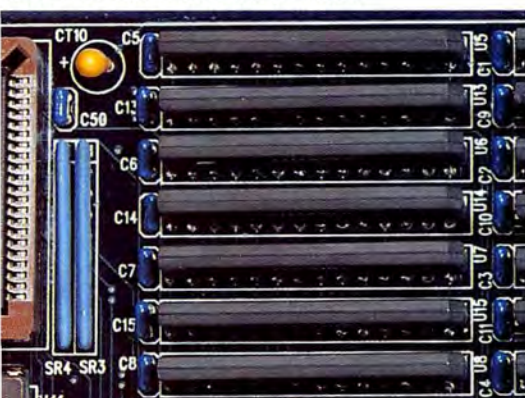
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- 600 X 600 dpi
- Adobe Postscript Level 2
- 8 Megs of Ram

**Monitors****14" COLOR MONITORS**

MACLAND - 640 X 480	\$599	\$379
Seiko 1445 - 640 X 480 Trinitron	\$599	\$499
Sony 1304S - 640 X 480 Trinitron	\$699	\$599
Magnavox 9CM080 - 640 X 480	\$599	\$399
Orion MacScan Ultra - 640 X 480	\$499	\$349

17" COLOR MONITORS

MACLAND 17	\$1,049	\$799
SuperMatch 17T Multi-Mode	\$1,299	\$1,129
Seiko 1760 Trinitron	\$1,449	\$1,149
Sony 1604S Trinitron	\$1,299	\$1,099
256 Color Card for all 17" Monitors	\$399	\$299
Million Plus Color Card for all 17" Monitors	\$999	\$549

MONOCHROME MONITORS

Orion Complete Page Display	\$499	\$369
Lapis 15" Portrait	\$499	\$399
Orion Dual Page Display*	\$899	\$699
Lapis 19" Two Page Display*	\$899	\$799

*Dual/Two Page Displays may require video card.

PowerBook Utilities

file will be treated during the synchronization process.

All together, this amounts to an overwhelming and confusing amount of visual information. Arrows outside the icons indicate which way a file is going to move: Files that don't exist on one disk are copied to it; when the same file exists on both disks, the newer one copies over the older one. At any point, you can override the defaults, specifically including or excluding any folder or file from this procedure (see Figure 5).

Once you have your folders matched and their contents defined, syncing is as easy as clicking on the Move icon. And, so you don't have to go through the setup all over again the next time, you can save the definitions in a setup document. With multiple setup documents saved, you can quickly and easily deal with different categories of files that might possibly be scattered around on your disks.

PowerMerge's main flaw is an error of omission rather than commission: It doesn't give you a way to handle a file that has been altered on both machines since the last time you synchronized them. It warns you of the conflict but does not let you save both versions — you are forced to either copy one over the other or leave them both alone.

Despite this omission in its first version, PowerMerge is the better of the two utilities. Its interface problem — hard-to-interpret icons — is strictly superficial. Sync's interface problems go deeper than that: You're kept waiting while entire directories are gathered, you're forced to move back and forth between lists, and you're frustrated because the program promises scripting but doesn't quite deliver what you need. Sync's underlying

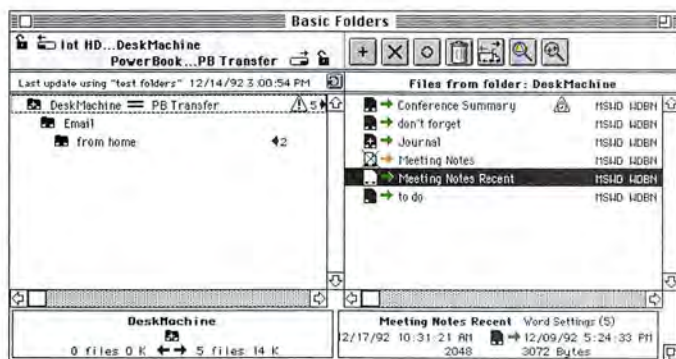



Figure 5: PowerMerge shows the matched folders in its left panel and the files within a selected folder in its right panel. A variety of marks on the file icons show which disk the files are on and whether they're going to be included in the syncing procedure. A warning icon indicates files that have been changed on both disks.

mechanics work flawlessly — everything is copied where you want it and the program can even save both versions of a document when both have changed since the last syncing. The program will probably be terrific in its next incarnation, but for now, it's still too much trouble to use.

Picking Partners

Much like the PowerBook itself, none of the PowerBook-specific packages we tested was perfect. Of the utilities, we have to give the nod to CPU. Although Norton Essentials offers a lot — including the slick instant-AppleTalk feature — the package's lack of feature integration and generally messy look keep it in second place. Given a little work, however, Essentials could move ahead of CPU.

Of the file synchronizers, PowerMerge, in spite of its confusing graphical interface, was clearly better than Inline Sync. Inline Sync shows promise — especially its scripting feature — but the program's interface and overall execution are so poorly designed that we can't recommend it. We're still a long way from true *data* synchronization, but file — which really means *version* — synchronization is a start. 

Sharon Zardetto Aker is working with Richard Wolfson on the second edition of his *PowerBook Companion* book.

Table 1: PowerBook Utilities

	CPU 1.0	Inline Sync 1.01	Norton Essentials for PowerBook 1.0	PowerMerge 1.1
	■■■■■	■■■½	■■■½	■■■½
List price	\$99	\$129.95	\$129	\$129
Company	Connectix Corp. 2655 Campus Dr. San Mateo, CA 94493 415-571-5100 415-571-5195 (fax)	Inline Design 308 Main St. Lakeville, CT 06039 203-435-4995 203-435-1091 (fax)	Symantec Corp. 10201 Torre Ave. Cupertino, CA 95014 408-253-9600 408-253-4092 (fax)	Leader Technologies 4590 MacArthur Blvd., Ste. 550 Newport Beach, CA 92660 714-757-1787 714-757-1777 (fax)

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Weekly Report



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Professional has the full capabilities to *accurately* scan virtually any document into almost any word processor, spreadsheet, or database file. So you can use *OmniPage* Professional to accurately scan newspaper articles, business reports, journals or legal documents. It's not surprising then that 8 out of 10 scanners in the world have shipped with a

trial version of *OmniPage*, including those from Hewlett-Packard, Epson, Microtek,[™] and Apple. Why would they be any different than the rest of us?

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Getting the Picture: Color Flatbed Scanners

*The right color flatbed scanner
should be flexible, inexpensive,
and able to handle all of your
scanning chores, from DTP to OCR.
But shop carefully —
most aren't up to the task.*

BY BRUCE FRASER

When it comes to moving an image from a piece of paper into your Mac, a flatbed scanner is the most flexible device — or at least, it should be. Most now offer 24-bit-color capability and can also scan gray-scale images, line art, and text. Many are priced at less than \$1,500, and some offer attractive software bundles. But how well do they work? To help you separate the winners from the duds, we torture-tested 15 affordable color flatbed scanners that aim to meet your day-to-day scanning needs. The winners were few and far between.

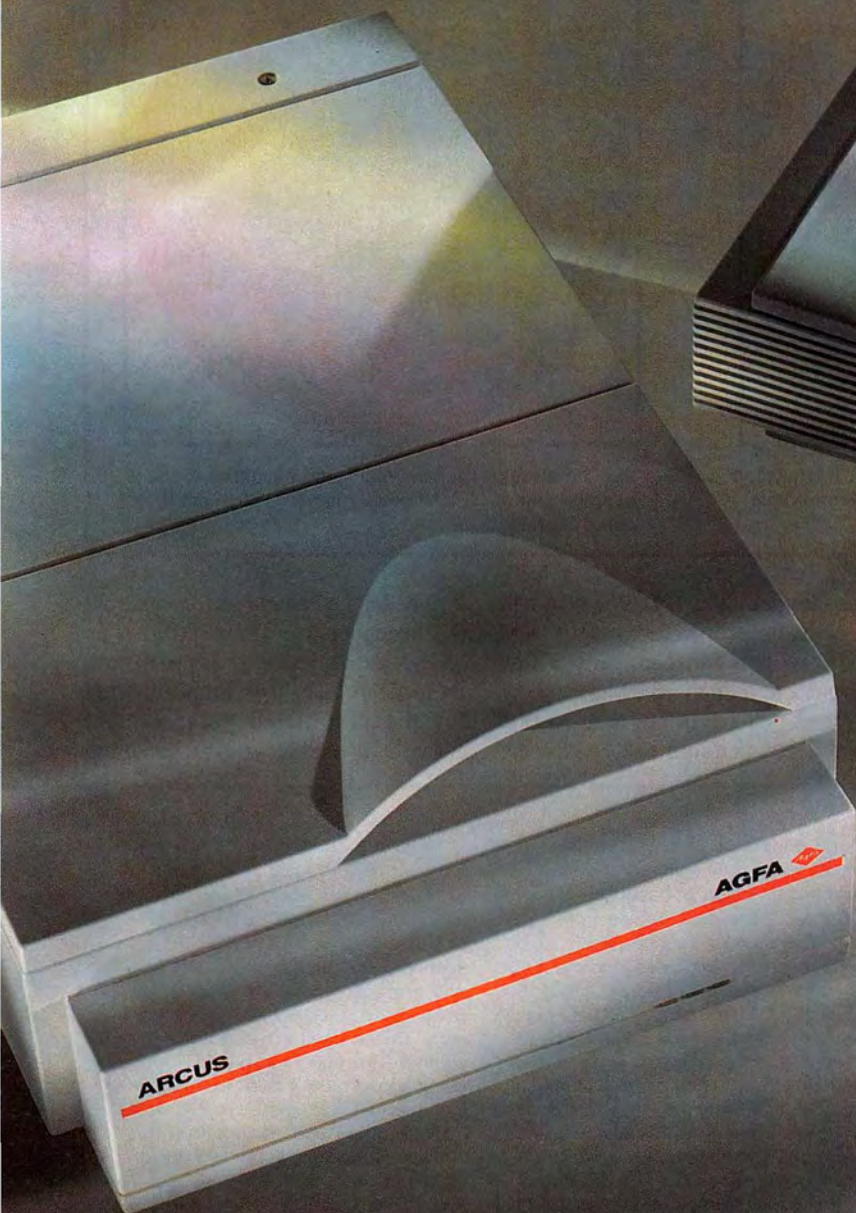
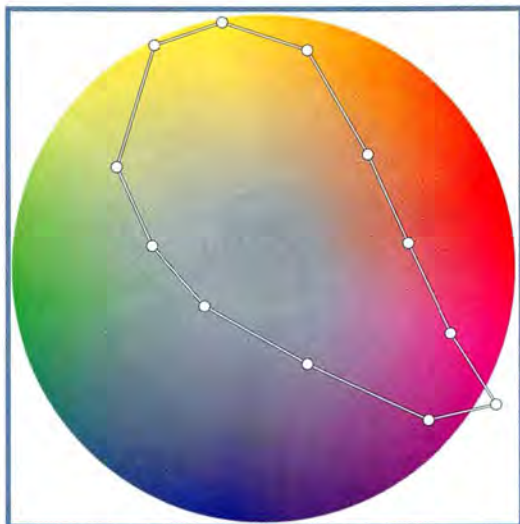


Figure 1: Running the Gamut from R to G to B

Figure 1: The circle of colors shown here represents all the colors the human eye can see. The scanners can see only those colors within the plotted area of the circle. This area is called the color gamut. A good scan requires a large, well-balanced color gamut. A large gamut provides the greatest range of colors, and a well-balanced gamut ensures that no one color dominates.



The Hewlett-Packard ScanJet IIc had by far the largest gamut. It was also well balanced, with no objectionable color shifting.



The Tamarack Artiscan 8000C had a smaller-than-average gamut, which limited the range of colors it could capture.

Reasonable Expectations

So how did we find out which scanners work best for most users? Simple: We used each scanner just the way you would — over and over and over. We scanned color photos.

We scanned line art. We scanned specially developed test images. And when we had finished, only a few scanners remained standing.

When you pay more than \$1,000 for a piece of equipment, you expect

it to be packed safely and contain all the needed parts. It should also be well documented and easy to install. Its software should be simple enough for the uninitiated yet powerful enough to enable you to get good

On the Horizon

Although we weren't too impressed with most of the color flatbed scanners we evaluated for this month's report, a few models that shipped too late to be included in our testing are worth taking a look at before you decide to buy.

The Apple Color OneScanner is a \$1,499 scanner that captures 24-bit color in a single pass. The Color OneScanner's claim to fame is that it comes bundled with the long-awaited Ofoto 2.0, the color version of Light Source's powerful but easy-to-use scanning software. Also included with the scanner are Apple's ColorSync color-management extension for System 7 and a ColorSync device profile for the scanner. If it all works as advertised, you should be able to get accurate color scans in one step.

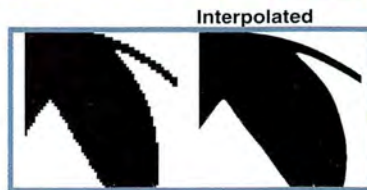
La Cie, whose scanning software was one of the few to garner high praise in our last flatbed-scanner lab (see "Capturing

Color: 24-Bit Scanners," December '91, page 152), has shipped the Silver-scanner II, which is based on a new one-pass/three-pass engine from Epson. The scanner captures 9 bits each of red, green, and blue information; gamma correction and contrast, brightness, and color-balance adjustments are performed on the full 9 bits per color *before* the image gets converted to the 8 bits per color that the Mac can handle. The result, claims La Cie, is excellent detail in both shadows and highlights. Enhancements to the Silver-scanner plug-in module include an electronic densitometer, color-histogram analysis of the image, and automatic tone adjustment. The Silver-scanner II is available with a variety of software bundles and with hardware options that include sheet-feeder and transparency attachments.

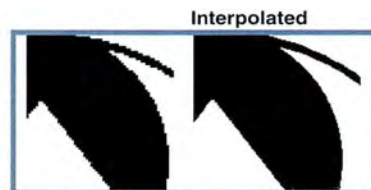
Mirror has announced the Mirror 600 Plus and 800 Plus color scanners. Up to now, Mirror's scanner offering has simply been the UMAX UC630 sold under Mirror's brand name, but the new scanners are of Mirror's own design and are accompanied by new Mirror-Scan software developed by the company. Each scanner has a three-pass engine: The 600 Plus has an optical resolution of 300 x 600 dpi (dots per inch) and an interpolated resolution as high as 600 x 600 dpi; the 800 Plus' optical resolution is 400 x 800 dpi, and its interpolated resolution is as high as 800 x 800 dpi. Software features include a zoomable color preview; sliders for brightness, contrast, and gamma; and an eyedropper tool for setting the white point and black point. The scanners are available with an optional transparency attachment and with or without

Figure 2: The Good, the Bad, and the Jagged

Figure 2: To be worth the investment, a color flatbed scanner should give you accurate color, gray-scale, and line-art scans. As we discovered, few can do it all.



Good: The AVR 3000 CL Plus performed poorly in our color tests but excelled in our line-art tests. Notice how smooth the scan becomes when interpolation is used.



Poor: The Hewlett-Packard ScanJet IIc excelled in our color tests, but its interpolation method was less effective than that used by the AVR scanners. Notice the slightly more jagged lines produced by the ScanJet IIc.



Good: The Agfa Arcus produced one of the most accurate scans of our skin-tone test image.



Poor: The scans produced by the Tamarack Artisan 6000C were dull, lacking the saturated colors found in the scans produced by the better scanners.

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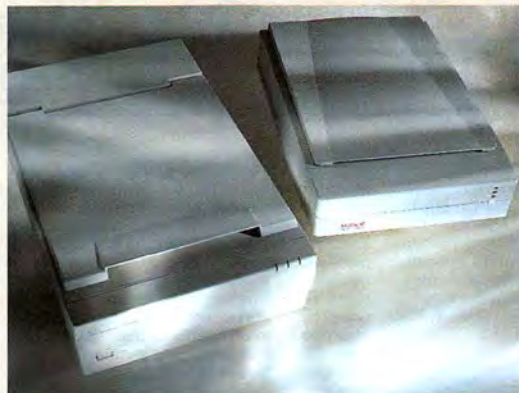
a bundled copy of Photoshop.

Agfa has a new plug-in driver for the Arcus, which improves an already good thing by offering hooks into Agfa's Foto-Flow color-management system. This enables on-the-fly RGB-to-CMYK conversion, making the Arcus an even-more-serious production tool.

Last but by no means least, there's Apple's ColorSync color-management architecture itself (see "Getting Color in Sync," March '93, page 165), which has profound implications for desktop color scanning. With third-party color-management vendors such as Electronics for Imaging (EFI) and Kodak moving to make their color-management systems ColorSync-compatible, the whole business of producing predictable, repeatable color on desktop devices should become much easier. It won't happen overnight — as yet, there is only limited

support for ColorSync from major applications, and there is no way so far to pass calibrated color information between rival color-management systems

— but we hope that when we next look at color scanners, we'll have many more positive developments to report than we did this time.



LaCie's Silverscanner II and Mirror's 600 Plus will attempt to raise the quality standard of inexpensive color flatbed scanners.

scans from even mediocre originals.

Perhaps most important, you want it to give you clean, accurate scans. In most cases, you need to fiddle with the image's color, contrast, size, brightness, or some other variable that just isn't right in either the original or in the image as your scanner

sees it. Most scanner software is in the form of a *plug-in*, a miniapplication that works within Adobe Photoshop, Fractal Design's ColorStudio, or one of the other popular image-editing applications that accepts such software. However, some scanners use stand-alone applications, one for

acquiring images and another for cleaning them up — a time-consuming division of labor.

We don't expect these desktop scanners to be smart enough to automatically fix what's wrong with originals (although that's now possible), but a scanner ought to automatically

The Ultimate Plug-In

A *plug-in* is basically a software accessory that adds features to another application — scan-control capability for Adobe Photoshop, for example. This Ultimate Plug-In doesn't exist — we've created it by assembling the best features from the software of several color flatbed scanners.

Basic Controls

All color-scanner plug-ins, like this segment from Agfa's Adobe Photoshop plug-in, offer certain basic controls: some way to select the area to be scanned, a way to set the resolution, and different scan modes — for example, 24-bit color, 8-bit gray scale, and 1-bit line art.

Brightness and Contrast

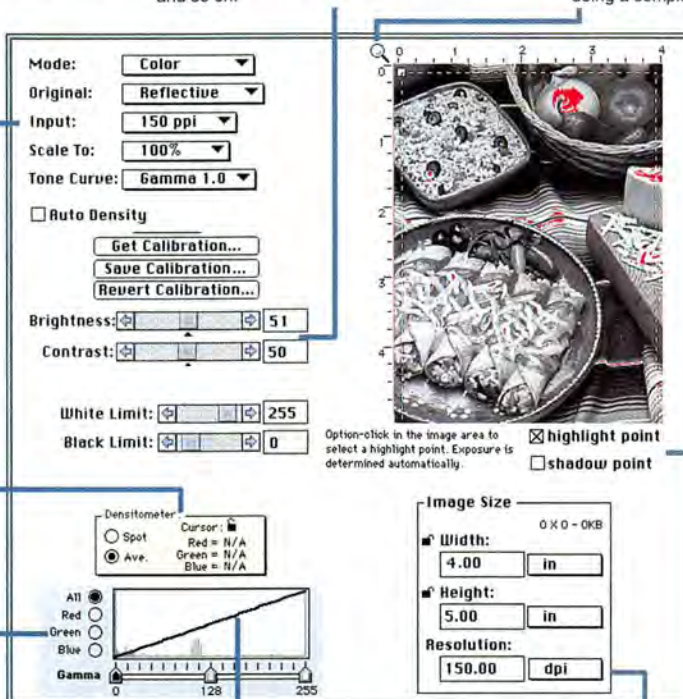
Most plug-ins offer brightness and contrast controls for gray-scale and color scanning. With skill and practice, you can use these controls to obtain good scans that capture most, if not all, of the tonal range of the original. But a great deal of trial and error is involved — if you reduce the contrast, you usually have to turn up the brightness and then increase the contrast, and so on.

Zoomable Preview

For line art, the threshold level is the optical-density point at which the scanner makes pixels black. For fine detail, a zoomable preview, as found in the La Cie plug-in, is almost a necessity if you want to see the effects of different threshold levels without doing a complete scan.

On-Screen Densitometer

Usually a color cast is most obvious in areas that should be neutral. To analyze these, an on-screen densitometer that provides a readout of the red, green, and blue values under the cursor — such as this one that comes in the La Cie plug-in — is invaluable. Some plug-ins offer halftoning: This is almost always an option to avoid unless you're printing *only* to a non-PostScript laser printer, because almost any PostScript printer can do a better job of converting gray scale to halftone than the scanner can and because once you've halftoned the image, you've lost all the gray-scale information and set the resolution permanently.



White- and Black-Point Selection

A more useful form of control, such as this option from Pixelcraft's plug-in, allows you to set an image's white point and black point — the points you want to appear pure white and solid black, respectively — and then the software automatically calculates the exposure for the intermediate tones. This plug-in is also helpful in that as you select a white or black point, the preview displays in red any areas that are darker than the black point you have selected or lighter than the white point. Reselecting your white and black points until all the red is out of your preview ensures that you've selected the entire tonal range of your image.

Separate Gamma Adjustments

Some plug-ins, such as Mirror's, offer separate gamma and black- and white-point adjustments for the red, green, and blue gamma curves. This powerful feature can be useful for correcting a color cast that appears in only one part of the tonal spectrum — for example, only in the highlights. Using it well takes quite a bit of practice and a good eye for judging images.

Gamma Curve

Mirror's plug-in lets you adjust the gamma curve, the curve that relates input intensity to output intensity. You can use this to stretch shadow detail without changing the black point and white point. Photoshop has similar controls, but they operate on the captured scan. You get better results and make better use of the 8 bits per color (red, green, and blue) the Mac can handle by making your white point, black point, and gamma adjustments before scanning, rather than after.

Cropping and Sizing

Too many scanner drivers allow you to select the scan area only by dragging a selection marquee over a tiny preview image, making it difficult to crop precisely. A better option is to set the selection size numerically. An even better option, such as this one offered by Leaf Systems for its high-end slide scanners, is the ability to set the desired *output* size and resolution — as in, "Make this scan 2 x 3 inches at 300 dpi." After all, the computer, not the user, should do the math.

provide a clean enough scan to reduce the amount of fiddling you have to do later.

Finally, when you buy any product, you buy into the company that made it and the company that sold it to you. If things don't go right, you should be able to expect prompt, courteous service that gets you through whatever problems you're having. We called each scanner vendor to see just what you can expect in terms of tech support — the results ranged from helpful to horrific.

Don't Get Me Started

In our speed tests, the Agfa Arcus and the Hewlett-Packard ScanJet IIC, both *one-pass* scanners (they scan all three primary colors necessary to create a full-color image — red, blue, and green — in one pass), returned the shortest times, followed by the *three-pass* Tamarack Artiscan 6000C (which scans red, blue, and green in three separate passes). The Agfa Arcus was almost 40 percent faster than the UMAX UC1200S, on which it's based, providing some indication of the success of Agfa's modifications to the firmware and software. The Relisys ColdScan 600 was notably slow, but the XRS OmniMedia 6c was the slowest, taking three times as long as the fastest scanners to scan the test image.

But raw scanning speed is relatively unimportant if the resulting scan is of poor quality — the time saved by a fast scan will be wasted if you need to spend half an hour cleaning up a lousy scanned image. To determine the quality of each scanner's images, we first scanned two color photos, using the software provided with each scanner at its default settings. One test image contained very *saturated* — pure — color; the other contained a wide variety of skin tones — a challenge to even the best scanners. We then asked a jury of desktop-publishing professionals to compare prints made from these scans with the original images.

The Hewlett-Packard ScanJet IIC

Something Completely Different

No, it's not a scanner like any you've ever seen. But for users who need to capture color but don't require high-resolution, high-quality images, a Canon RC-570 still-video camera might be a better option. Just point and shoot with an RC-570, and then, through its optional digitizer NuBus card, connect it to your Mac and directly download your images for further retouching and inclusion in your documents. No film or film processing is required.

The images from the RC-570 aren't

bad, but they're not nearly as high in resolution as those produced by the flatbed scanners we tested for this report — the RC-570 produces an image on a par with that of a high-grade consumer video camera. But if all you're interested in doing is capturing small color images to be printed on low-grade paper, such as in a small newsletter, a still-video camera may be the answer. Canon USA, Inc., Still Video Division, One Canon Plaza, Lake Success, NY 11042; 516-488-6700.



What the Canon RC-570 still-video camera lacks in resolution, it makes up for in convenience.

and the Agfa Arcus were the only scanners to produce excellent results with both images, with good color accuracy and shadow detail. The Microtek ScanMaker IIXE, the Mirror 600 Color Scanner, and the UMAX UC630 and UC1200S also did well, but not as well as the two leaders. When a scanner performed poorly, we asked an expert scanner operator to rescan the images, using any applicable capabilities of the supplied software to improve the scans. The Relisys ColdScan 600 and the XRS OmniMedia 6c, which offered full-featured software, were able to improve their grades substantially, but little could be done for the virtually unusable color scans produced by the AVR and Tamarack scanners.

To test *color consistency*, we performed two identical scans some minutes apart and then compared them by subtracting one from the other in Photoshop. The resulting subtracted image is a pixel-by-pixel record of the differences between the

two scans — ideally, the two scans should be identical. The Agfa Arcus, Generation Systems 600 Color Scanner, Hewlett-Packard ScanJet IIC, Mirror 600 Color Scanner, UMAX scanners, and XRS OmniMedia 6c all showed very little variation. The Mustek MFS-6000CS showed significant color changes due to lamp fluctuations, as did the AVR 8000 CLX and the Tamarack Artiscan 8000C.

Scanning the Straight and Narrow

Flatbed scanners aren't just for scanning photos. Our research tells us that most users of inexpensive color flatbeds actually spend most of their time scanning line art and text. We tested each scanner's ability to capture line art and text, taking both the *optical* (true) resolution and the *interpolated* resolution into account.

Optical resolution in the horizontal direction is limited by the *CCD array* (charge-coupled-device array

— the “eyes” of the scanner) on the scanning head, and vertical optical resolution is controlled by the stepper motor, which moves the scan head. Interpolation increases the apparent resolution of scanned images, using software to add pixels between those actually “seen” by the scanner and to estimate their color. There are many interpolation algorithms: They don’t enable the scanner to pick up detail that’s smaller than what it can see, but they do smooth jagged edges, which is particularly useful when

you’re scanning an image for auto-tracing in a program such as Adobe Streamline, Adobe Illustrator, or Aldus FreeHand.

To evaluate the effects of each scanner’s interpolation, we scanned a finely detailed piece of line art and then used Photoshop to magnify the result so that the effects were clearly visible. The AVR 3000 CL Plus and 8000 CLX, which did poorly in most of our other tests, were the clear winners here — so much so that if you need a scanner *only* to scan line art,

they are well worth considering. The Agfa Arcus, Hewlett-Packard ScanJet IIC, Microtek ScanMaker IIXE, and UMAX UC840 and UC1200S all did well, although the scanners with a higher optical resolution had an advantage. Interpolation on the other scanners wasn’t particularly useful.

Sad Story Made Short

The majority of these low-cost color flatbed scanners had flaws, ranging from slight to serious, that

How We Tested Color Flatbed Scanners

Testing a color flatbed scanner is a complex process with a simple goal: to discover what it would be like for a typical user to live with each scanner on a day-to-day basis. To do this, we not only ran an exhaustive series of tests but we also spent long hours working with each scanner’s software and features to learn which scanners would make good working partners and which would tempt us — and you — to give up in frustration.

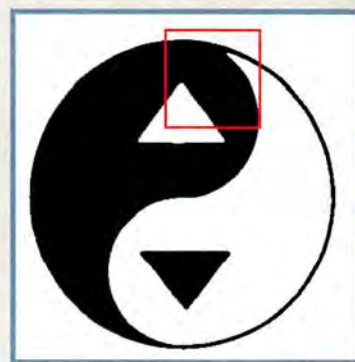
We began in much the same way as a new user would: We took careful note of the contents of each box, looking for efficient packaging — including useful documentation, clear warranty information, and an easy-to-find tech-support number. We then hooked up each scanner to our test platform, a Mac IICI with 20 megabytes of RAM, a 1-gigabyte hard drive, and a 20-inch color monitor running 24-bit color from a 24-bit accelerated-video card.

We began by scanning two color images: one with areas of *saturated*, or

pure, colors as well as areas of shadow and shadows. We then printed these scans on a Tektronix Phaser IIso dye-sublimation color printer and set the images before our jury of color experts, who judged them without knowing from which scanner each was taken.

Our research made it clear that most color-flatbed-scanner owners want a lot more than just high-quality color scans from their color flatbed scanner. In fact, many users rarely take advantage of their scanner’s color capabilities, instead using it primarily for OCR and line-art scanning. To test each scanner’s proficiency when scanning noncolor images, we scanned some line-art samples with interpolation both on and off and then zoomed in on the scans, using Photoshop, to test the effectiveness of each scanner’s interpolation method.

Although we tested the speed of each scanner’s engine, obtaining an objective timing of how long it takes to get a good scan is almost impossible,



We tested each scanner’s ability to scan this very-high-resolution line art, both with and without interpolation enabled.



The areas of shadow, saturated color, and reflections contained in our first test image challenged each scanner’s ability to accurately capture saturated colors without tinting the areas of shadow.



Our second test image had a variety of skin tones — a difficult image for most scanners to reproduce accurately.

because scanning relies so heavily on human factors and operator insight. For this reason, we looked at the usability of the accompanying software and noted just how many hoops we had to jump through to get good scans — if it was even possible to get good scans.

We also tested the repeatability of the scanning results — that is, how much variance there was between two scans of the same image scanned at the same settings at different times. This test showed that some scanners vary much more than others in the stability of the light source and in the amount of *noise*, or extraneous or missing information, in the scanning head’s CCD (charge-coupled device).

After gathering the data for these somewhat subjective tests, we put each of the scanners through a series of objective tests to see how accurate our jury had been in determining just which

prevent us from recommending them:

Software. The UMAX UC630, UC840, and UC1200S come with weak software that is not intuitive and offers little in terms of image control. In the case of the UC1200S, this is doubly galling, because the Agfa Arcus is based on the same engine. Agfa's software and firmware modifications make the Arcus a totally different — and superior — scanner.

The AVR 3000 CL Plus and 8000 CLX have counterintuitive software

— for example, you can set the resolution to 1,600 dpi (dots per inch), but unless you *also* check the Interpolate box, you won't get the resolution you asked for. The software also has a baffling check box marked Gamma, which you can set to either on or off. We couldn't ascertain just what this feature did, however. More unfortunately, neither could AVR's tech-support staff.

We were unable to get the resolutions we requested from the Tamarack Artiscan software: Requests for

150, 200, and 300 dpi returned 152, 204, and 304 dpi, respectively. The software also crashed numerous times.

Scan Performance. The Generation Systems 600 Color Scanner had some registration problems, but we suspect that they may have been unique to that unit. Mirror offers the same package — same scanner, essentially identical software, same warranty — for substantially less, so we see no reason to recommend the Generation Systems scanner unless

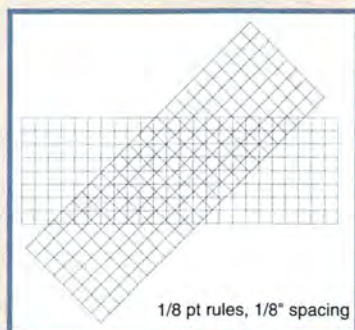
scanners produced the best scans.

We made color scans of a special image-quality-testing target that contains neutral gray swatches of increasing optical density, going from white to black. We then plotted the RGB (red, green, and blue) values the scanner recorded

for each swatch. This test enabled us to determine the scanner's ability to capture shadow detail and its susceptibility to *color casts*, which is the tendency to emphasize one color over another. A color cast that is constant across the whole range from light to dark can be corrected easily, but a scanner that scans red in the highlights and blue in the shadows produces images that are much more difficult to correct.

For our next test, we scanned an industry-standard Kodak Q-60 color target, sampled the RGB values obtained, and used them to plot each scanner's *color gamut*, the range of color

This image — a target comprising a series of gray swatches of increasing optical density — tested the scanners' ability to capture shadow detail without adding a false color tint.

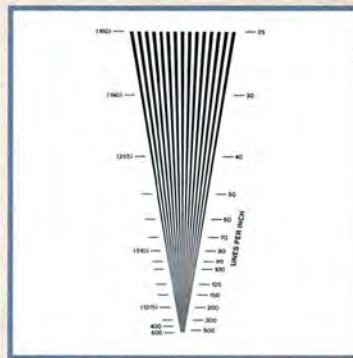


To test each scanner's ability to maintain registration in all colors, we scanned a grid of fine black lines. Scanners that had poor registration produced color fringes on the edges of the lines.

each scanner can capture (see Figure 1). From the plots, we ascertained how much saturation each scanner could capture at different hues (in other words, how pure a level of each color the scan-



We scanned this industry-standard Kodak Q-60 color target to plot each scanner's color gamut (the range and balance of colors each scanner could see).



Our final test image was a target that contained wedges of progressively finer lines. The point at which the lines converge marks the scanner's true resolution.

ner could see) and whether it captured each hue accurately. A very large gamut isn't necessarily good: The gamut must also be well balanced (centered on the plot). If a scanner can handle much more saturation in the reds than in the greens, it's likely to produce inaccurate scans.

We then checked the *registration*, or alignment, of the red, green, and blue channels, by scanning a grid of fine black lines in color. Scanners with poor registration produced colored shadows, or fringing, next to the black lines. To determine the true resolution of the scanner, we used a target composed of wedges of progressively finer lines, noting the point at which the lines converged. Last, but by no means least, we made anonymous calls to each vendor's tech-support line. We considered all these factors in our ratings.

Rating Tech Support

To see what kind of support consumers can expect after purchasing a scanner, we made anonymous phone calls to each of the vendors represented in this report and asked a simple question. We compared how easy they were to contact; how long we were kept waiting; and of course, whether they provided a correct answer. Only three earned excellent marks. Our question and the correct answer were as follows:

Q. I've set up my scanner, but when I start up my Mac, I get a blinking question mark in a little floppy-disk icon on the screen.

A. The scanner's SCSI ID is set to the same number as that of the startup drive. Change the scanner's SCSI-ID number.



your Generation Systems dealer provides a few hundred dollars' worth of free training.

The Mustek MFS-6000CS is a repackaged Microtek ScanMaker 600Z — a model Microtek itself has discontinued. The Mustek scanner also comes with an outdated version of the Microtek software, is rather slow, and is somewhat overpriced. It's possible, with some difficulty, to get reasonable results from the MFS-6000CS, but the unit is simply out-of-date.

The XRS OmniMedia 6c is also based on the older Microtek engine but has major changes in firmware and comes with newer Microtek software. Its \$3,000 list price makes this scanner the least expensive dual-purpose flatbed we've seen. It includes a built-in transparency attachment, but the older engine, as modified by XRS, is painfully slow (the slowest of all the ones we tested), and the scan quality is unexceptional.

Although weak in most other respects, the AVR 3000 CL Plus and 8000 CLX beat all the other flatbeds in the line-art tests. The AVR scanners have excellent interpolation, and even though one has an optical resolution of 300 dpi whereas the other has an optical resolution of 400 dpi,

little difference was evident between interpolated 1,600-dpi scans from the two scanners. However, their performance on color scans was so poor that these scanners are almost useless for color scanning.

The Tamarack Artiscan 6000C and 8000C did very poorly on the color-image tests and ranked near the bottom in all the other tests.

The Relisys ColdScan 600 is unique in that it uses a cold-cathode light source, which should be more stable than the fluorescent lamps used in most flatbed scanners. However, the software crashed fairly frequently, offered little in the way of control, and produced mediocre color scans that had a distinct green cast. The ColdScan 600 had a much more serious problem too — a wildly unstable SCSI interface. We could get it to work only by disconnecting all other external SCSI devices, and the problem wasn't resolved, even after a visit from the product manager. This scanner isn't yet ready for prime time.

Tech Support. Mustek won the dubious honor of having perhaps the worst tech support we have ever encountered. It's available by appointment only, and when we called on a Thursday, the earliest appointment

we could get was for 2 P.M. the following Monday. On top of that, customers unfortunate enough to miss tech-support's return call must go back on the waiting list for another appointment — another three or four days, in our case. When we asked for a faster response, we were told that tech support didn't care if we were "at our mother's funeral" when we missed the call; we'd have to wait.

UMAX tech support failed to return any of our anonymous calls — not one. Tamarack made it hard to reach tech support at all: The tech-support number listed in the Artiscan manual is for a location in Taiwan. We did, thankfully, find a U.S. support number buried deep in the ReadMe file on the software disk.

Packaging. Agfa sets a new standard for wasteful packaging: Every item is separately sealed in a plastic bag. Unpacking the Arcus calls to mind Russian nested dolls.

Getting Warmer . . .

The ideal desktop scanner has yet to appear: Both of our top picks — the inexpensive Hewlett-Packard ScanJet IIc and the superior but costly

Table 1 Criteria

List price — The vendor's retail price for the scanner.

Street price — The average price of the scanners at dealers surveyed across the U.S. or through mail order in January 1993.

Maximum scan area — The largest possible image the scanner can accommodate, in inches.

Optical resolution — Sometimes called *real resolution*, the maximum resolution of the scanner without software interpolation, in dots per inch.

Interpolated resolution — The maximum resolution of the scanner with software interpolation, in dots per inch.

SCSI-ID selector — The method used to change the scanner's SCSI-ID number.

SCSI termination — Whether the scanner can be terminated with an

The Bottom Line

Despite advances in scanning technology and reductions in price, the ideal affordable desktop color scanner doesn't yet exist.

The **Agfa Arcus** (\$3,950 list, \$3,300 street) represents a breakthrough in performance for a color flatbed scanner and it deserves special praise for its software, but it's expensive for casual users.

The **Hewlett-Packard ScanJet IIc** (\$1,599 list, \$1,385 street) proves that excellent scanner engines can be inexpensively produced, but its accompanying software seems designed to appeal more to technical wizards than to creative artists.

Most of the other scanners have software that is either counterintuitive or that lacks essential features such as the ability to accurately set the cropping

or image size. We'd hoped to find a scanner that combined the superior software of the Agfa Arcus or the **Microtek ScanMaker IIXE** (\$1,699 list, \$1,175

street), the robust engine of the Hewlett-Packard ScanJet IIc, and the price of the **Mirror 600 Color Scanner** (\$1,199 direct). We're still waiting.



The Agfa Arcus (left) and the Hewlett-Packard ScanJet IIc (right) were the sharpest choices in an otherwise dull set of color scanners.

Agfa Arcus — had their share of annoyances.

The ScanJet IIc was the only scanner we tested that lacks a Photoshop plug-in. A TWAIN driver for the scanner, which should allow scanning directly into Photoshop, is under development but was unavailable at press time. Instead of a Photoshop plug-in, the ScanJet IIc uses Desk-Scan, a DA that provides features

enough for sophisticated users but whose interface is counterintuitive, to say the least. For example, to set the resolution for a scan, you have to either define a printer path or choose a predefined one from the Printer Path pop-up menu. You *must* read the manual in order to get up and running with this software.

The quality of the ScanJet IIc's scans does go a long way toward

making up for the unusual software, and demanding users will find it worthwhile to invest the time needed to scale the learning curve. For those whose needs are more casual, however, the Hewlett-Packard software may prove intimidating.

We were very pleased with the Arcus' software and performance, but the scanner itself has some minor annoyances. For example, it has only one 50-pin SCSI port. Although a pass-through SCSI cable is included with the unit, allowing it to be placed anywhere on a SCSI chain, a replacement pass-through cable will be difficult to find if your cable fails. The locking bracket for shipping the Arcus is attached by a screw that easily strips its hole in the scanner's plastic body, and once the bracket has been removed, it's easy to lose.

Conclusions? Although color-flatbed-scanner prices are enticing, be careful, or you'll spend over a thousand dollars on a product that might offer you only headaches and frustration — unless you heed our recommendations in "The Bottom Line."

Bruce Fraser is a San Francisco Bay Area author and frequent contributor to *MacUser*. Michael Clasen, a project leader at ZD Labs, managed the testing for this report.

continues ►

external terminating block or by removing internal terminating resistors, which can be a hassle.

Controls, indicators — The scanning controls and indicator lights found on the scanner itself.

Scan to disk/RAM — Whether the software allows you to scan directly to the disk, forces you to scan to RAM and then save to disk, or lets you do both.

Preview — The kind of preview — black-and-white and/or color — that the scanner's plug-in offers.

Cropping — Does the plug-in allow you to select a portion of the image to be scanned?

Brightness/contrast controls — Does the scanner provide controls for you to adjust brightness and contrast?

Threshold control — Can you select a point at which the scanner will

consider a level of gray as either white or black?

Color-gamma adjustment — Can you adjust the saturation levels for each hue or color to be scanned?

Cables included — Are Macintosh cables included with the scanner?

Sheet-feeder option — Is a sheet-feeder option available?

Transparency option — Is a transparency option available?

FCC certification — Did the vendor supply documentation proving that the tested scanner complies with FCC requirements? Class B means that the vendor provided a verifiable FCC Grant of Certification. Class A means the manufacturer has tested the scanner, and the scanner has passed the FCC's Class A requirements. According to the FCC, Class A products should not be sold in the consumer market.

Table 1: Features of Color Flatbed Scanners

● = yes ○ = no	Agfa Arcus ‡‡‡‡	AVR 3000 CL Plus ‡‡	AVR 8000 CLX ‡‡	Generation Systems 600 Color Scanner ‡‡½	Hewlett-Packard ScanJet IIc ‡‡‡½
List price	\$3,950	\$1,995	\$2,295	\$1,579	\$1,599
Street price	\$3,300	\$1,050	\$1,205	\$1,579 (direct)	\$1,385
Pros	Fast. Accurate color scans.	Excellent for line-art scans.	Excellent for line-art scans.		Fast. Accurate color scans.
Cons	Expensive.	Poor software. Poor color scans.	Poor software. Poor color scans.	The Mirror scanner for more money.	Poor software; no Photoshop plug-in. Poor tech support.
Hardware features					
Engine manufacturer	Toshiba	Toshiba	Toshiba	Toshiba	HP
Maximum scan area	8 x 11.75 in.	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.
Optical resolution	600 x 1,200 dpi	300 x 300 dpi	400 x 400 dpi	300 x 600 dpi	400 x 400 dpi
Interpolated resolution	1,200 x 1,200 dpi	1,600 x 1,600 dpi	1,600 x 1,600 dpi	600 x 600 dpi	400 x 400 dpi
SCSI-ID selector	dial	DIP switch	DIP switch	dial	dial
SCSI termination	external	external	external	external	external
Controls, indicators	power switch, 3 lights, SCSI-ID selector	power light, power switch	power light, power switch	power switch, 2 lights, SCSI-ID selector	power light, power switch, SCSI-ID selector
Min. system requirements					
RAM	8 MB	2 MB	2 MB	2 MB (4 MB for System 7)	2 MB
Mac	24-bit color	System 6.0.4	System 6.0.4	any Mac with a SCSI port	any Mac with a 20-MB hard drive, System 6.0.5
Plug-in features					
Scan to disk/RAM	scan to RAM only	both	both	both	NA*
Preview	color	black-and-white	black-and-white	black-and-white	NA*
Cropping	●	●	●	●	NA*
Brightness/contrast controls	●	●	●	●	NA*
Threshold control	●	●	●	●	NA*
Color-gamma adjustment	●	○	○	○	NA*
Other					
Cables included	●	●	●	●	●
Sheet-feeder option	○	●	●	●	●
Transparency option	●	●	●	○	○
Warranty	1 year	1 year	1 year	1 year	1 year
FCC certification	Class B	Class A	Class A	Class B	Class B
Company	Agfa Division of Miles 200 Ballardvale St. Wilmington, MA 01887 800-685-4271 508-658-5600 508-658-4193 (fax)	AVR Technology 71 E. Daggett Dr. San Jose, CA 95134 800-544-6243 408-434-1115 408-434-0968 (fax)	AVR Technology 71 E. Daggett Dr. San Jose, CA 95134 800-544-6243 408-434-1115 408-434-0968 (fax)	Generation Systems 2648 Patton Rd. St. Paul, MN 55113 800-325-5811 612-633-5222 612-633-1083 (fax)	Hewlett-Packard Co. P.O. Box 58059 Santa Clara, CA 95051 800-752-0900 (sales) 208-323-2551 303-350-4042 (fax)

*The Hewlett-Packard ScanJet IIc does not come with a Photoshop plug-in. The scanner comes with a stand-alone application that performs this function.



It can pick a fly out of your pea soup.
It never faints at the sight of blood.
It can digest a whale in 60 seconds.

While these may not be the qualities you want in a dinner date, they may be precisely what you're looking for in a color scanner.

If so, meet the new UMAX UC840. Built using the same high-quality technologies that recently earned our other color scanners top marks from both *MacUser* and *PC Computing*.

The UC840 renders halftones, line art and text with hard-to-believe clarity and detail (800 × 400 dpi, to be exact). In fact, through software interpolation, you can get up to 1600 × 1600 dpi! Details that competitive scanners can lose sight of — like the wings of that annoying little fly — come through with particular clarity.



With the optional UMAX Transparency unit, you'll get maximum accuracy and flexibility.

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We'd also like to make a point about speed, if you have a minute. Because that's about all it takes the UC840 to scan a 4 × 5-inch color image

(other scanners can take two to five times as long).

And if you have a few more seconds, we'll give you a few more important facts: The dynamic range is wide enough to read the most subtle differences between 16.8 million 24-bit colors, and 256 shades of gray. It's both Macintosh and PC-compatible. And image editing software is included, free of charge. If that weren't enough, the UC840 is incredibly easy to maintain. We even offer 48-hour turn around in the unlikely case repairs are required.

Call 800-562-0311 today, and we'll tell you where to catch a demonstration of the new UC840. (Feel free to bring along your dinner date.)

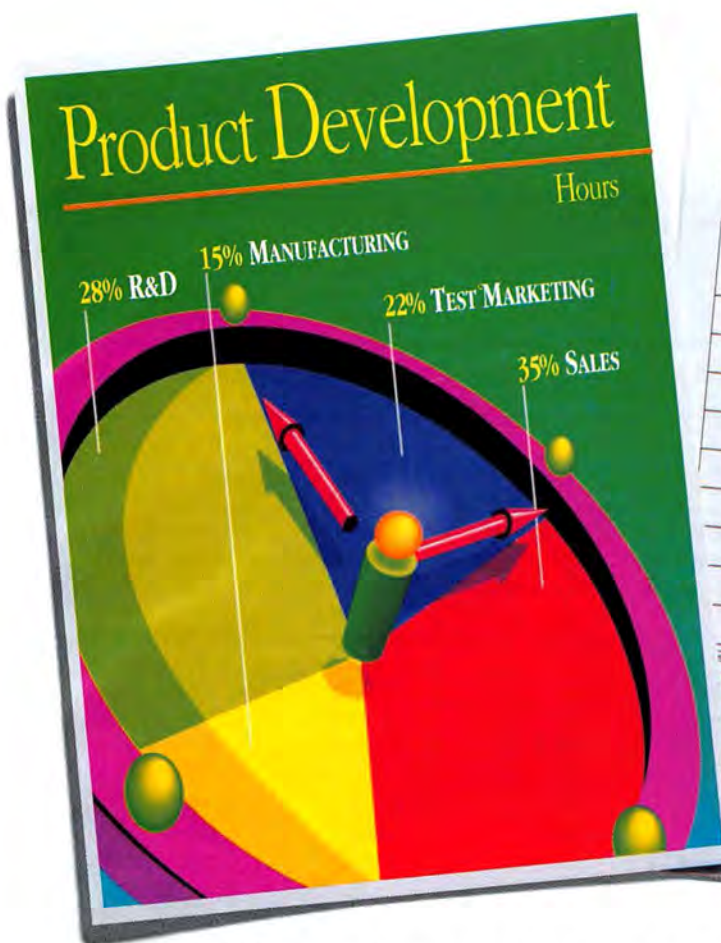
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Table 1: Features of Color Flatbed Scanners, continued

● = yes ○ = no	Microtek ScanMaker IIXE ***	Mirror 600 Color Scanner ***	Mustek MFS-6000CS **	Relisys ColdScan 600 **	Tamarack Artiscan 6000C **
List price	\$1,699	\$1,199	\$1,595	\$1,695	\$1,245
Street price	\$1,175	\$1,199 (direct)	\$1,595 (direct)	\$1,045	\$1,065
Pros	Good software bundle.	Good software bundle. Good support.			
Cons			Tech support by appointment only. Out-of-date software.	Poor SCSI implementation. Poor software. Poor color scans.	Poor color scans. Software crashed frequently. Tech support in Taiwan.
Hardware features					
Engine manufacturer	Microtek	Toshiba	Microtek	Relisys	Epson/Toshiba
Maximum scan area	8.5 x 13.5 in.	8.5 x 14 in.	8.5 x 13.5 in.	8.5 x 14 in.	8.5 x 11.7 in.
Optical resolution	300 x 600 dpi	300 x 600 dpi	300 x 600 dpi	300 x 600 dpi	300 x 600 dpi
Interpolated resolution	1,200 x 1,200 dpi	600 x 600 dpi	600 x 600 dpi	600 x 600 dpi	600 x 600 dpi
SCSI-ID selector	push wheel	dial	push wheel	DIP switch	push wheel
SCSI termination	external	external	external	external	internal
Controls, indicators	power switch, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector	power switch, manual scan, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector
Min. system requirements					
RAM	5 MB	2 MB (4 MB for System 7)	2 MB	4 MB	2 MB
Mac	SE/30 (II recommended)	any Mac with a SCSI port	SE/30; II for color mode	II	SE/30 or II, 40-MB hard drive, System 6.0.4
Plug-in features					
Scan to disk/RAM	scan to RAM only	both	scan to RAM only	both	scan to RAM only
Preview	color, black-and- white	black-and-white	color, black-and- white	black-and-white	black-and-white
Cropping	●	●	●	●	●
Brightness/contrast controls	●	●	●	○	●
Threshold control	○	●	○	●	○
Color-gamma adjustment	●	○	●	●	●
Other					
Cables included	●	●	●	●	●
Sheet-feeder option	●	○	○	●	○
Transparency option	●	○	○	○	●
Warranty	1 year	1 year	1 year	1 year	1 year (parts), lifetime (labor)
FCC certification	Class B	Class B	Class B	Class B	Class B
Company					
	Microtek Lab 680 Knox St. Torrance, CA 90502 800-654-4160 310-352-3300 310-538-1193 (fax)	Mirror Technologies 2644 Patton Rd. Roseville, MN 55113 800-654-5294 612-633-2105 619-759-0293 (fax)	Mustek 15225 Alton Pkwy. Irvine, CA 92718 800-468-7835 714-453-7740 714-833-7813 (fax)	Relisys 320 S. Milpitas Blvd. Milpitas, CA 95035 800-783-2333 408-945-9000 408-945-0587 (fax)	Tamarack 1544 Centre Pointe Dr. Milpitas, CA 95035 800-643-0666 408-956-0144 408-956-1552 (fax)



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REQUESTION NO: 163438

DATE: 12-10 REQUESTOR: *Sohn* DEPARTMENT: NEW ORDER: TO BE USED FOR:

QUANTITY	DESCRIPTION	DATE REQUIRED	DATE RECEIVED	TOTAL COST
1	Tektronix Phaser 200 color printer			\$3,695.00
	✓ laser paper			
	✓ 2pp/min			
	✓ Adobe PS Level 2			

APPROVED

RECOMMEND *dual-tray option* COST: \$3,695.00

☒ WITHIN BUDGET ☐ OUTSIDE BUDGET

SUPERVISOR: *[Signature]* DIRECTOR: PRESIDENT: *[Signature]*

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Our new color printer not only looks great on paper, it looks great on paper.

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Tektronix



Table 1: Features of Color Flatbed Scanners, continued

● = yes ○ = no	Tamarack Artiscan 8000C ‡‡	UMAX UC630 ‡‡½	UMAX UC840 ‡‡	UMAX UC1200S ‡‡½	XRS OmniMedia 6c ‡‡½
List price	\$1,545	\$1,795	\$1,995	\$4,600	\$3,000
Street price	\$1,340	\$1,125	\$1,350	\$3,275	\$2,630
Pros					Built-in transparency attachment.
Cons	Poor color scans. Software crashed frequently. Tech support in Taiwan.	Poor software. Poor documentation. Poor tech support.	Poor software. Poor documentation. Poor tech support.	Poor software. Poor documentation. Poor tech support.	Slowest scanner tested. Mediocre scans.
Hardware features					
Engine manufacturer	Epson/Toshiba	Toshiba	Toshiba	Toshiba	Microtek
Maximum scan area	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.	8.5 x 13.5 in.
Optical resolution	400 x 800 dpi	300 x 600 dpi	400 x 800 dpi	1,200 x 600 dpi	300 x 600 dpi
Interpolated resolution	800 x 800 dpi	1,200 x 1,200 dpi	1,600 x 1,600 dpi	1,200 x 1,200 dpi	600 x 600 dpi
SCSI-ID selector	push wheel	dial	dial	dial	proprietary
SCSI termination	internal	internal	internal	internal	external
Controls, indicators	power switch, 3 lights, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector	power switch, 3 lights, SCSI-ID selector	power switch, manual scan, SCSI-ID selector
Min. system requirements					
RAM	2 MB	2 MB	2 MB	2 MB	2 MB
Mac	SE/30 or II, 40-MB hard drive, System 6.0.4	SE/30 or II	SE/30 or II	SE/30 or II	II
Plug-in features					
Scan to disk/RAM	scan to RAM only	both	both	both	both
Preview	black-and-white	black-and-white	black-and-white	black-and-white	color, black-and-white
Cropping	●	●	●	●	●
Brightness/contrast controls	●	●	●	●	●
Threshold control	○	●	●	●	○
Color-gamma adjustment	●	○	○	○	●
Other					
Cables included	●	●	●	●	●
Sheet-feeder option	○	○	○	○	●
Transparency option	●	●	●	●	included
Warranty	1 year (parts), lifetime (labor)	1 year	1 year	1 year	1 year
FCC certification	Class B	Class B	Class A	Class B	Class A
Company	Tamarack 1544 Centre Pointe Dr. Milpitas, CA 95035 800-643-0666 408-956-0144 408-956-1552 (fax)	UMAX Technologies 3170 Coronado Dr. Santa Clara, CA 95054 800-562-0311 408-982-0771 408-982-0776 (fax)	UMAX Technologies 3170 Coronado Dr. Santa Clara, CA 95054 800-562-0311 408-982-0771 408-982-0776 (fax)	UMAX Technologies 3170 Coronado Dr. Santa Clara, CA 95054 800-562-0311 408-982-0771 408-982-0776 (fax)	XRS Scanner Corp. 4030 Spencer St. Torrance, CA 90503 310-214-1900 310-214-1474 (fax)

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With resolutions up to 2700DPI the LS-10 offers more useable resolution than any scanner in it's class. And as always, Nikon's driver software offers full control of scanner functions like editable contrast curves, and interactive "live focus" to insure the highest quality scans.

Rent the new Nikon "Coolscan" for one week with the option to buy!

Try the "Coolscan" for yourself for one week and if you like the results, we'll apply your entire rental fee (\$150.00 for the week) to the purchase price. For more information, or to place an order, fax us at the number listed below. (Please include your name address and phone number).

Ken Hansen Photographic

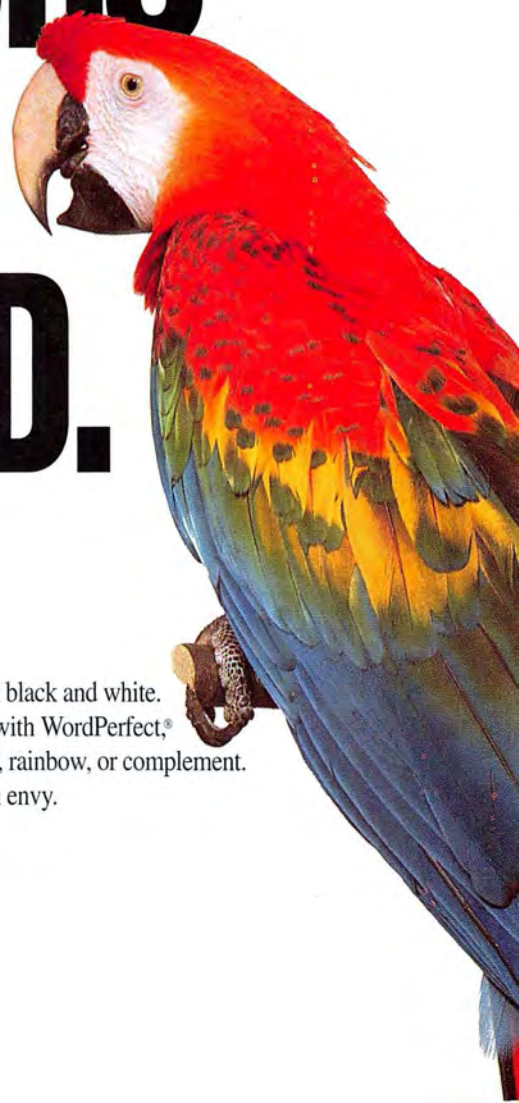
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PLANNED GROWTH

To Matthew Long, a just didn't make sense. His beloved hometown of Elbow, Maine, had had a severe housing shortage ever since the big pizza store factory opened in nearby Sabina.

WordPerfect - which has done much to spur the local economy - are building, even trying up in small apartments. Some are even sleeping in cars.

Mr. Long, who happens to be a contractor, wants to help by building



any more strangers than the ones we have now."

Mr. Long says it differently. "I think it's pretty obvious. Everyone with a stronger heart at one time or another,

affordable new homes for these workers. Unfortunately, that's the last thing the Elbow Zoning Board wants to happen.

Else, they say, fast enough houses. "We have to control our growth," says Barney Hutchinson, longtime resident and councilman.

any more strangers than the ones we have now."

Mr. Long says it differently. "I think it's pretty obvious. Everyone with a stronger heart at one time or another,

While the current recession has generally eased much of this country's growth problems, in any area it has not ebbed at all. In Las Vegas, population increases



LAS VEGAS - Ever since gambling came to its desert town, people have, too. Between 1970 and

1990, its population almost doubled. By 1990, over a quarter-million people were calling it home. If trends continue, say experts, Las Vegas will have a whole new set of hands.

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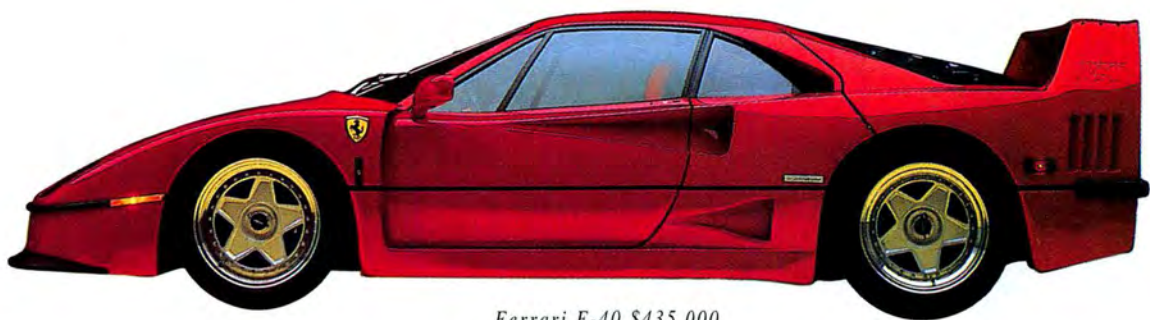
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Paint and Draw	256 custom	81 draw	256	NO
Common tool bar with module-specific tools	YES	NO	NO	NO
Log-in scripts/phone book	YES	NO	NO	YES
Multiple columns can be turned on/off anywhere on the page	YES	NO	NO	NO
Auto Sum Tool	YES	NO	NO	NO

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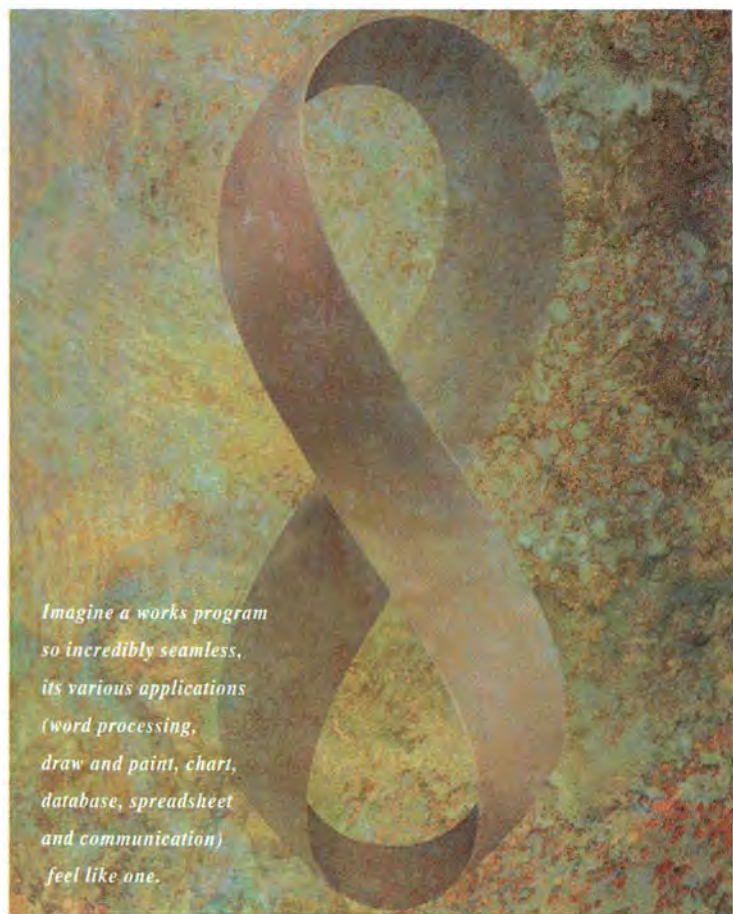
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Affordable Luxury: Two-Page Color Monitors

*It seems like only
yesterday when
viewing a big
spread on a
color monitor
meant emptying
your pockets.
Not anymore.*

BY LINDA JACOBSON



Desktop-color professionals need them at almost any cost. No argument there. Even if you're only a desktop-color amateur, you may want one but haven't been able to justify the expense. Still, it would be so nice to be able to see two whole pages of your color layout simultaneously instead of having to scroll around, peeping through a small porthole at the large images you can create on your Mac. Is this really a luxury you can't afford? Maybe — but maybe not.

In the fall of 1991, a high-quality two-page monitor with a 24-bit-color card cost at least \$5,000. Today's equivalent costs a lot less: On average, a two-page color monitor costs about \$2,800 if you pay full retail or \$2,300 if you pay a discounted price. If that still sounds like a lot of money, remember that it's buying you a lot of screen real estate.



OK, what exactly is a *two-page* monitor? The obvious definition is that it is capable of displaying two 8.5-x-11-inch pages simultaneously. But do those two pages give you a picture at actual size? Again, maybe, maybe not. On a smaller screen, such as a 16-inch Mac display, the standard resolution is 832 x 624 pixels (see "Setting the New Standard: 16-Inch Color Monitors," January '93, page 104). The resulting images are displayed at 72 dpi (dots per inch), the standard we call *WYSIWYG* (what you see is what you get).

Larger, two-page monitors come in three stated sizes: 19 inches, 20 inches, and 21 inches. These sizes are determined by measuring the glass at the front of the tube, from one corner to the opposite corner. Some manufacturers include glass that is hidden inside the case, behind the plastic bezel, in this measurement. But the really important measurement is the *active-screen size*, the total amount of that glass that can actually light up and display an image. Active-screen sizes on two-page color monitors range from 17.7 to 19.5 inches, again measured from corner to opposite corner.

Most of the monitors we tested can display images at a variety of pixel dimensions, or resolutions.

Some can handle the 19-inch standard of 1,024 x 768 pixels, the Mac 21-inch standard of 1,152 x 870 pixels, and even 1,280 x 1,024 pixels. With various screen sizes and pixel dimensions, the image you see on-screen is not necessarily 72 dpi (see Figure 2 for some examples of pixel dimensions, active-screen sizes, and the resulting dpi).

If the image is displayed at 66 dpi, for example, it will appear enlarged and less of the total image may be visible on-screen. If it is displayed at 81 dpi, it will appear smaller but more of the total image will be on-screen. Obviously you have a lot of choices to make, so let's get started.

The Contenders

MacUser and ZD Labs evaluated the color capabilities, image quality, and user-friendliness of 17 two-page displays. We ran them through their paces with a Quadra 950 that was outfitted with 2 megabytes of on-board VRAM (video random-access memory) supporting 16-bit color. (For a primer on 8-bit, 16-bit, and 24-bit color, see the "Bit by Bit" sidebar.)

For those who require the convenience of a plug-and-play monitor, we included seven marketed specifically for the Macintosh: the Apple

Macintosh 21" Color Display, E-Machines T19 II, Radius Precision-Color Display/20, and RasterOps 20T/Multiscan and three models from SuperMac — the SuperMatch 20 Dual-Mode, the SuperMatch 20•T Multimode, and the SuperMatch 21 Two-Page Color Display.

We realize that your office might not be a Mac-only workplace, so we tested ten *autosynchronous monitors*, or *autosyncs*, that work with other computer platforms as well as with Macs. These were the Hardware That Fits RealTech 20" Trinitron, Ikegami CT-20D, Mitsubishi Diamond Pro 20, Nanao Flexscan F750i 21" and T660i 20", NEC MultiSync 6FG, Philips Fast Refresh/20, Pixelink PX20T, Seiko CM2070LR Color Monitor, and Sony GDM-1936 20" Multiscan.

All these monitors can run with the Mac Quadra system's on-board video, right out of the box. The Quadra 900's on-board video supports 21-inch video in 8-bit color. The Quadra 950's supports 21-inch video at a maximum of 16-bit color when equipped with an additional 1 megabyte of VRAM (about \$150 at press time). To display 24-bit color, you need to add a 24-bit-color card such as the E-Machines Futura LX (\$1,299), the NEC MacFG 24X

Bit by Bit



24-bit color: 16,777,216 (2²⁴) shades
24-bit color is created from 32 bits of information: 8 bits for each channel of red, green, and blue and another 8 bits for an *alpha* channel for other effects, such as transparency, depending on the application.



16-bit color: 32,768 (2¹⁵) shades
16-bit color is created from three 5-bit channels — one channel for red, one for blue, and one for green — and another 1 bit for the alpha channel. Can you see a difference between 24-bit and 16-bit?



8-bit color: 256 (2⁸) shades
8-bit color is created from an 8-bit lookup table that references three 8-bit channels for simultaneous display of 256 of 16,777,216 shades. The difference between 8-bit color and 16- or 24-bit is easier to see.

Does Every Little Bit Count?

Is 24-bit color really better than 16-bit color? And if so, how much better? To find out, we asked a mixed group of experienced graphics experts and everyday Mac users to compare a set of images displayed in both 16- and 24-bit color and didn't tell them which was which. What we discovered might save you money.

If you remember that the number of bits determines how many colors are available, you might immediately assume that more is better: 24-bit color offers 16,777,216 shades, whereas 16-bit color provides only 32,768. Both modes are substantially more colorful than 8-bit, which yields a paltry 256 shades.

But these bits cost bucks: 8-bit-color video is built in to many Macs, 16-bit on-board video comes standard with the more costly Quadra 950, and 24-bit color requires a 24-bit-video card. Although the card is an added expense with any Mac system, many cards provide acceleration as a bonus. And don't forget that those bits also eat up gobs of memory.

So the real questions are, How many different shades can you actually see? and How much are you willing to spend to see them? We set up two SuperMac SuperMatch 20+T Multimode monitors. One was connected to a Quadra 950 running on-board 16-bit-color video. The other was also connected to a Quadra 950, and we added a SuperMac Spectrum 24 accelerated-video card for displaying 24-bit color.

The jury eyeballed four complex and

colorful Adobe Photoshop images: a woman's face, a bright-red race car, a country landscape, and a close-up of a French horn. The viewers tried to guess which monitor was displaying 16-bit color and which was displaying 24-bit. Panelists were not allowed to watch as the technicians loaded each new image: The 24-bit accelerated-video card can redraw the screen much faster than can the Quadra alone, which would have been a dead giveaway.

The graphics experts leaned close to the monitor to examine color gradients, graininess, and color shifts in the lighter and darker areas of the images. The most-visible differences appeared in the shadowy areas of the images. The 16-bit-video display exhibited a tweedy effect in dark areas: Individual pixels of gray, brown, and black were visible. The darker areas on the 24-bit display were smoother, and individual pixels were harder to distinguish. Both displays offered extremely clean images, and the novices couldn't see the differences until the experts pointed them out.

The verdict: If you need to work with color images, 16-bit color can provide ample quality for viewing, cropping, and placing those images. If your work includes photo retouching or other special effects, 24-bit color may be necessary. For tips on getting the most out of 24-bit systems, see "Living with Living Color," July '91, page 217. If you can't tell the difference, you can probably save your money and stick with 8-bit color for now.

(\$1,499), the Radius PrecisionColor 24XK (\$999) or 24X (\$1,849), or the SuperMac Spectrum/24 Series III (\$999). (Don't know whether you need 24-bit color? See the "Does Every Little Bit Count?" sidebar.)

You can also run a two-page monitor with a Mac IIci, IIsi, or IIfx if you have the correct cable, but the on-board-video standard for these machines is 640 x 480 pixels. Instead of displaying two pages' worth of your image, this setup gives you an enlarged version of the same piece of the image you would view on a 14-inch monitor (with the wrong cable, you'll see a blank screen). You'll need to add a video card if

you want to view the additional pixels available on the screen of the two-page display.

Behind their bezels and logos, most 19- and 20-inch monitors use 20-inch Sony Trinitron tubes. The 21-inch monitors use 21-inch shadow-mask tubes. The Trinitron tube has an *aperture grille*, a mesh of tightly stretched, vertical wires through which electrons are shot at stripes of red, green, and blue phosphor on the inside of the screen. In *shadow-mask* tubes, electrons are propelled through small holes in a sheet of metal (Invar is the most popular alloy) onto individual phosphor dots on the screen. With either system, the illuminated

red, green, and blue phosphors combine to produce all the colors you see on the display.

Is Setting Up Hard to Do?

Setting up a Mac monitor should be a snap, right? Put it on your desk, plug in the power cable and the Mac video cable, and turn the monitor on. Bear in mind, though, that these are really big monitors, weighing from 70 to 85 pounds. So for step 1, have a helper handy and remember to bend your knees.

Some manufacturers didn't supply the correct cable and/or cable adapter with our test monitor, although they claim that a Mac cable is included when the unit is sold to Mac customers. To be safe, always specify the computer you'll be using with a monitor and the resolution(s) at which you'll be running it (Apple 21-inch, for example). That way you'll be sure to get the right cable. And find out whether the cable costs extra before you buy.

The Apple Macintosh 21" Color Display and the SuperMac SuperMatch 21 Two-Page Color Display operate at only one resolution (1,152 x 870 pixels), so you need just one cable/adapter combo to set up one of these monitors. The other monitors can operate at more than one resolution, but they need a special adapter to correspond to the particular resolution a system supports.

If you need a manual to tell you which plug goes where, you'll have trouble setting up the Hardware That Fits RealTech 20" Trinitron, Ikegami CT-20D, Pixelink PX20T, or RasterOps 20T/Multiscan. The manuals for these monitors fail to mention the Mac hookup at all.

Won't You Please Help Me?

When the going gets tough, the tough get on the phone and call tech support. Our test-team members devised three questions and, without identifying themselves as ZD Labs technicians, contacted each manufacturer's tech-support department to

evaluate helpfulness, communication skills, knowledgeability, and response time. You'll find our results in the "Rating Tech Support" sidebar.

The tech support at E-Machines, Radius, and RasterOps impressed us the most, although E-Machines lost points for keeping us on hold for an average of nine minutes (twice as long as any other vendor). NEC's and Sony's tech support failed to answer two of the questions correctly. The staff at Hardware That Fits and SuperMac couldn't solve the memory puzzle. The tech support at Ikegami

was stumped by the jitter problem and asked us to return the monitor for service. Pixelink's tech support gave the wrong answer to the cable question.

Control Issues

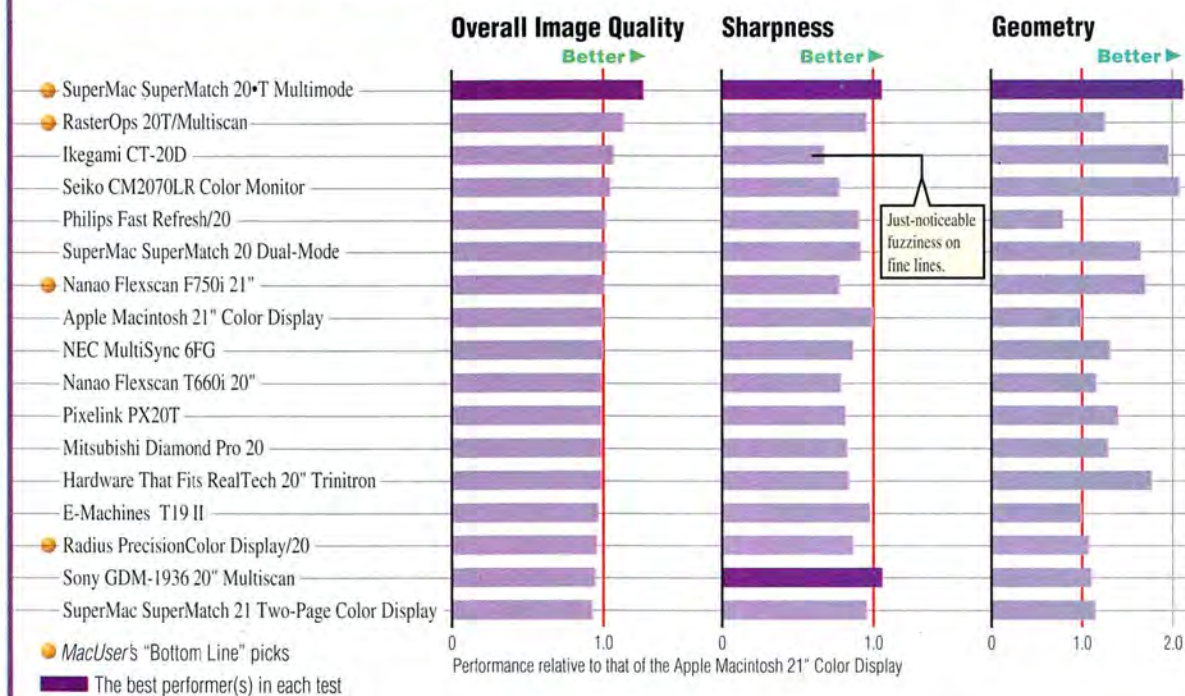
Most large monitors have plenty of user controls, except for the Apple Macintosh 21" Color Display and the SuperMac SuperMatch 21 Two-Page Color Display, which simplify matters by providing just two adjustments: brightness and contrast. The others, because they're autosyncs,

On the Horizon

Now that some color monitors come with built-in microprocessors, you can store monitor settings once you've gotten them just right. In fact, Hitachi, Mitsubishi, Philips, Pixelink, Sony, and SuperMac all began shipping new 19- and 21-inch color monitors with microprocessors and front-panel controls since we finished this report. Despite this welcome advance in control, there's still one problem: the frustratingly long time it takes to get the correct setting.

Radius has come to the rescue with software that promises to make adjusting your Radius monitor faster and more

Figure 1: The Big Picture



Overall Image Quality:

We combined the results of our individual tests to arrive at a ranking of the overall image quality of two-page color monitors. The SuperMac SuperMatch 20-T Multimode and the RasterOps 20T/Multiscan took top honors in a tight race. For each test, a monitor's score is shown relative to that of the Apple Macintosh 21" Color Display, which is given the value 1.0.

Sharpness:

We used a Microvision Superspot 100 System to find each monitor's MTF (modulation transfer function), an objective measurement of sharpness. Two monitors, the SuperMac SuperMatch 20-T Multimode and the Sony GDM-1936 20" Multiscan, outperformed the Apple Macintosh 21" Color Display. Bringing up the rear, the Ikegami CT-20D exhibited fuzziness that was just barely noticeable.

Geometry:

Perfect geometry means that straight lines are really straight and circles are really round. We used a Microvision Superspot 100 System to check for *pincushioning* — how far a line of pixels on-screen deviates from being perfectly vertical or perfectly horizontal. Only the Philips Fast Refresh/20 exhibited a noticeable amount of pincushion error.

intuitive. As of April 1993, you can buy Radius' IntelliColor software with the company's new 20-inch PCD/20 Monitor (the price was undetermined at press time). While retaining the familiar front-panel controls, Radius has added a control panel that has animated icons and help screens for deciphering commands such as H-phase, VSTAT, and Convergence. If you don't like your changes, just click on a button to undo your work and return to your starting point.

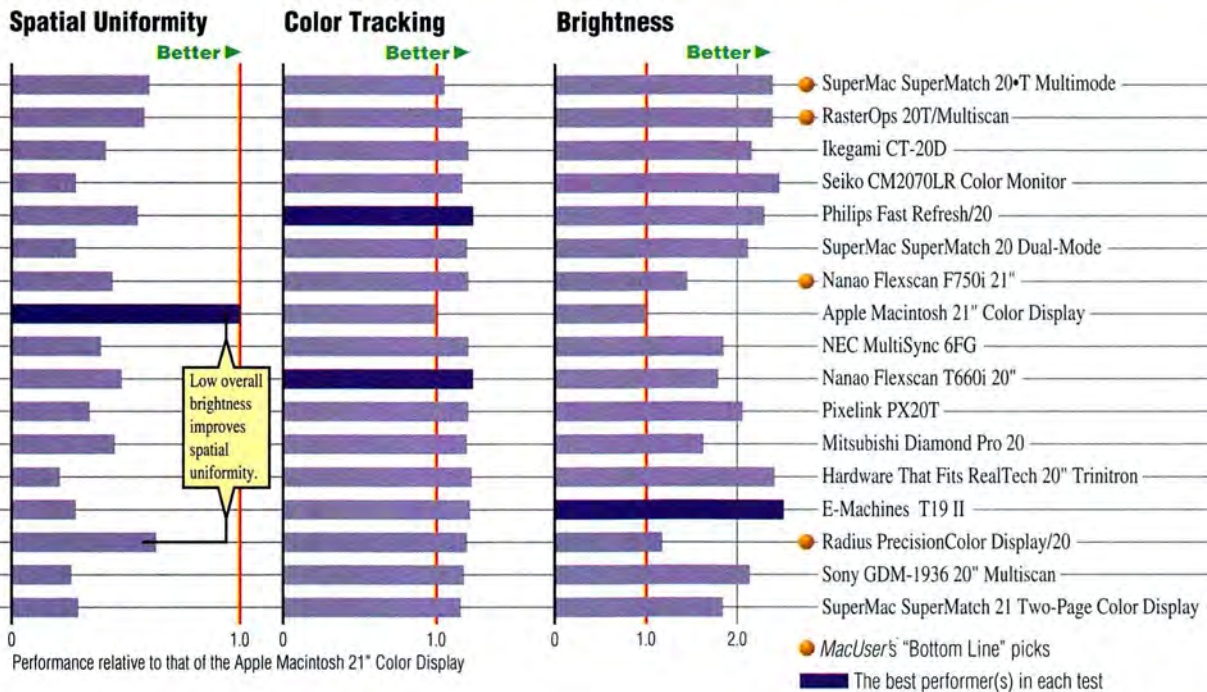
IntelliColor also gives you improved control over color calibration. Instead of changing the RGB (red, green, blue)

output levels on the graphics card, you can use IntelliColor to directly control the electron guns through your monitor. Previously, if one gun was firing at a lower intensity, you had to turn down the intensity of the two higher-intensity colors on the card to match the lower-intensity one. With direct gun control, you can amplify the lower-intensity signals to match the higher-intensity ones. The result is a brighter image after calibration. Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; 800-227-2795 or 408-434-1010.

— Nancy Peterson

which have to be able to deal with different resolutions and different frequencies, require more tweaking to get the right-sized image positioned in the right place on-screen. Consequently, they provide multiple controls that, in many of the monitors, are married to built-in microprocessors that store and recall adjustments.

In any case, you'll want easy, front-panel access to the monitor's power switch (including a power-on LED) and contrast and brightness controls. The Hardware That Fits, Pixelink, and Seiko monitors' controls are on



Spatial Uniformity:

An ideal monitor would exhibit exactly the same brightness anywhere on the screen. However, almost all monitors are somewhat brighter in the middle of the screen and dimmer at the edges. If the difference is significant, the colors you see on-screen can be affected. We used a Minolta Color Analyzer CA-100 to assess *spatial uniformity* by measuring brightness levels at nine points on the screen. The Hardware That Fits RealTech 20" Trinitron exhibited noticeably poor uniformity.

Color Tracking:

To produce colors on a monitor's screen, three electron guns fire at red, green, and blue phosphors on the inside of the screen. If the electron guns don't fire at the correct intensity, the colors won't be correct. We measured a range of on-screen grays produced when all three guns fired at equal intensities. All but two monitors had very good to near-perfect scores. The Apple Macintosh 21" Color Display and the SuperMac SuperMatch 20•T Multimode had some color-tracking problems.

Brightness:

Different users prefer different brightness levels, which is why all these monitors provide controls for adjusting brightness. However, some monitors provide a much wider range, allowing you to turn the brightness way up without sacrificing sharpness. We used a Minolta Color Analyzer CA-100 to measure how bright each monitor could be while still maintaining the best possible focus. The E-Machines T19 II was 2.5 times as bright as the Apple Macintosh 21" Color Display.

Figure 2: Ending Resolution Confusion



An image displayed at 1,024 x 768 pixels on a 17.7-inch active screen yields 72 dpi.



The image displayed at 1,152 x 870 pixels on a 17.7-inch active screen yields 81 dpi.



The image displayed at 1,024 x 768 pixels on a 19.5-inch active screen yields 66 dpi.

Figure 2: The two-page color monitors covered in this report are capable of displaying a variety of video resolutions. These different pixel dimensions, coupled with the range of available active-screen sizes, are a bit of a puzzle to users accustomed to the 72 dpi (dots per inch) of WYSIWYG (what you see is what you get).

A higher number of dpi results in image elements that appear reduced, so more of the total image can be squeezed into the available screen real estate. A lower dpi number produces image elements that appear enlarged, with less of the total picture fitting on-screen. These illustrations provide examples of what you might see on a two-page monitor, depending on the active-screen size and pixel dimensions.

the side, making quick adjustments difficult. And why does Apple choose to place its power switch on the *back* of its monitor?

Some of the monitors also offer *pincushion* (screen geometry) and/or *convergence* (electron-beam adjustment) controls. The monitors from Nanao, NEC, Philips, and Radius even have color-temperature controls for letting you specify the whiteness of whites. This control is useful for people involved in serious color work, but it's probably overkill for anyone doing general-purpose desktop publishing. (For details on controls and other product specifications, see Table 1.)

Looking Sharp

What should you look for in a two-page color display? A clear, crisp image and excellent color quality should be at the top of your list.

We harnessed the power of our Microvision Superspot 100 System and Minolta Color Analyzer CA-100 to objectively judge the image and

color quality of all 17 two-page displays. (See the "How We Tested Two-Page Color Monitors" sidebar for a description of our setup and

How We Tested Two-Page Color Monitors

ZD Labs technicians entered the darkness of the labs' monitor-testing facility with 17 two-page monitors and returned with qualitative data and dilated pupils. The dark environment decreased the possibility that ambient light would affect the measurements made with a Microvision Superspot 100 System and a Minolta Color Analyzer CA-100, sitting atop a Newport MST Series vibration-control table. We used the Superspot to run an *MTF* (modulation transfer function) test on each monitor and to do tests for pincushion error, misconvergence, and time variance (nuisance factors: jitter, swim, and drift). The Color Analyzer was used to measure color temperature, color range, spatial uniformity, color tracking, and maximum usable brightness.

Spatial Uniformity

A monitor with good spatial uniformity varies in brightness only slightly from area to area on its screen. Typically, the center of the display is brightest, with some tapering in luminance toward the edges.

We assessed spatial uniformity by measuring the luminance of nine areas on the display and then calculating the percentage of variation by normalizing the standard deviation of the measurements to the average brightness. Monitors with variations within 10 percent were considered uniform.

Color Tracking

A color monitor produces shades of gray by equally illuminating red, green, and blue phosphors on the inside of the screen. If the electron gun that fires at

Rating Tech Support

We made anonymous calls to each of the vendors represented in this report to find out what kind of service consumers get after purchasing a monitor. The important issues were whether we reached a tech-support representative immediately; whether we were left on hold (and for how long); whether we had to leave a message and be called back (and how long that took); and, of course, whether our questions were answered correctly. Radius and RasterOps provided top-notch technical support, offering the correct responses to all three questions in the shortest period of time. NEC and Sony failed to provide correct answers to the first two questions. Our questions and the correct answers were as follows:

- Q.** I can display only 256 colors. Shouldn't I see more?
A. You need to buy more VRAM (video random-access memory).
Q. My screen is so jittery I can't work with it.
A. Something near the system, such as a desk lamp, is interfering with the monitor's magnetic field.
Q. Nothing appears on-screen, or everything appears really big.
A. Either you have the wrong cable or your cable has the wrong adapter for two-page resolution.

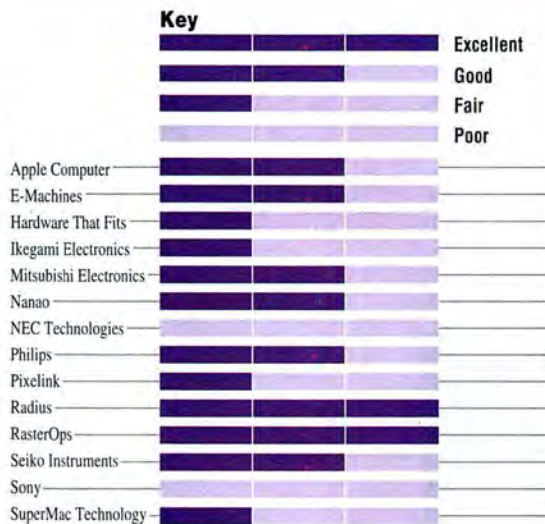


Figure 1 for the test results.)

We know that you don't want a blurry monitor. Besides giving you a poor representation of your image, it will probably give you a headache. So we first performed an *MTF* (modulation transfer function) test to measure each monitor's ability to display crisp vertical and horizontal lines a single pixel wide. The MTF test is an objective measure of focus, or sharpness. The top scores went to two Trinitron monitors: the Sony GDM-1936 20" Multiscan and the

SuperMac SuperMatch 20•T Multi-mode. Except for the Ikegami CT-20D, all the other displays did well, which is not an easy task for a high-resolution monitor that's dishing out more than a million pixels.

For desktop publishing, you'll want a monitor with accurate screen geometry: squares that consist of ruler-straight lines and circles that appear perfectly round. Ideally, the outer edges of the screen shouldn't distort the geometry just because the electron beam has to travel farther to

light the phosphors there. Realistically, such distortion does occur, and it's measured in pincushion tests. Most monitors exhibit some pincushion error, but that's why many monitors also have a pincushion control.

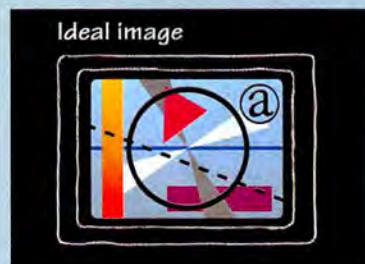
We performed several other important image-quality tests on all the monitors. One test measured *convergence*: how precisely each of the three electron beams strikes its targets — the individual phosphor dots or stripes. We also looked at nuisance factors — *jitter*, *swim*, and *drift*

one phosphor color fires at a strength much weaker or much stronger than that of the other guns, you'll see a less than pure shade of gray. For instance, a greenish gray would appear on-screen if the electron beam directed at the green phosphor were stronger than those directed at the blue and red phosphors.

ZD Labs checked color tracking by measuring the percentages of the maximum red, green, and blue intensities on-screen as the levels of gray were stepped down in equal increments from white to black. Calculating the percentage of correctness meant taking the average of the maximum percentage difference

between beams at each step and subtracting that from 100 percent, the best possible color-tracking score. A display with good color tracking is able to keep all of its beams at relatively equal intensities, exhibiting correctness of 90 percent or higher.

— Stephen Chan



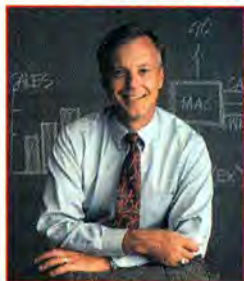
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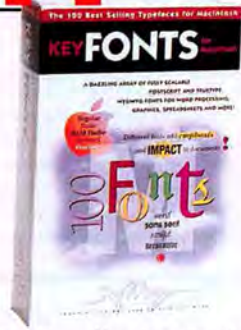
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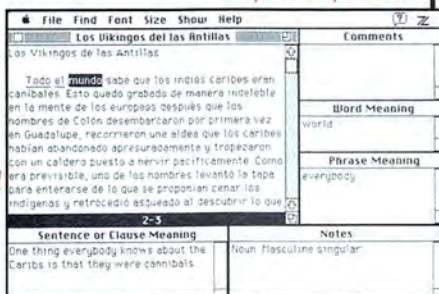
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1/2

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Q825163	SuperMAC VideoSpigot LC	SuperMAC	\$253
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Q825150	SuperMAC/24 Color Graphics Card	SuperMAC	\$795
Q825151	SuperMAC/24 Series III	SuperMAC	\$798
Q825146	Radius	VideoVision	\$2099

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Q800062	Teleport Silver	Global Village	\$368
Q800063	Teleport Gold	Global Village	\$439
Q900271	Comstation one 2400 w/96Fx	PSI	\$159
Q900272	Comstation two 24/96 96Fx	PSI	\$249
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Q900923	"EtherMac II-C(AUI, 10BT,BNC,64K)"	Farallon	\$198
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Q900933	EtherMac LC(10BT)	Farallon	\$150
Q900935	"EtherMac LC(Thinnet, 10baseT)"	Farallon	\$165
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Q900941	"EtherMac 30iTN(Thinnet, AUI,16K)"	Farallon	\$182
Q900943	"EtherMac 30i10T(10BT,AUI,16K)"	Farallon	\$181
Q900945	"EtherMac 30iC(10BT,AUI,BNC,64K)"	Farallon	\$230
Q901911	D@MacCon+ IIET64(AUI/10BT)	Asante	\$155
Q901912	D@MacCon 3 for NuBus w/64K(AUI/BNC/10BT)	Asante	\$189
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Q901921	D@MacCon+ 30iET 64K(AUI/10BT)	Asante	\$155
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Q901932	D@FriendlyNet AAUI/THIN	Asante	\$79
SCSI Adaptors			
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Q901442	D@SCSI-Ethernet 10BASET Mac PowerBook Adaptor	Asante	\$279

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Q283904	Little Mouse	MSC	\$73
Q27791	MouseMan Mouse	Logitech	\$75
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Q825228	Typist Plus Hand Scanner	Caere	\$318
Q2255	ScanMan Model 32 Scanner	Logitech	\$288

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Q825126	40Mhz w/68882 Math Chip	DayStar Digital	\$678
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Manufacturer: 3M

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Q79110	3.5 DSD	FUJI	\$0.81 ea.	\$0.61 ea.
Q79119	3.5 DSD FRMT	FUJI	\$0.88 ea.	\$0.66 ea.
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The Bottom Line

Have you made the decision to treat yourself to a two-page color monitor? Find one that's bright and sharp, has good geometry, and scores well on color tracking, and you'll have an extremely good monitor for general-purpose color tasks.

For those seeking the very finest in large monitors, our top choice is the **RasterOps 20T/Multiscan** (\$2,499 list, \$2,265 street). It exhibited excellent color and image quality. In fact, this monitor's only serious drawback was that the manual didn't provide Mac-setup instructions. However, RasterOps provides an outstanding three-year warranty and highly responsive technical support. And RasterOps dealers can provide monitor service. The monitor also can be ordered as the **CorrectColor/20T** (\$3,999 list), which includes a built-in color-calibration system; an Adobe Photoshop plug-in; Kodak's Color Processor software; and a CD-ROM containing scanner, printer, and press-proof system profiles.

Our second choice is the **SuperMac SuperMatch 20•T Multimode** (\$2,999 list, \$2,490 street), another bright monitor that's extremely sharp and offers excellent screen geometry. SuperMac also provides a three-year warranty.

Another winner is the **Radius PrecisionColor Display/20** (\$2,859 list, \$2,440 street), which has good color

tracking and received a top ranking in tech support.

We also highly recommend the **Nanao Flexscan F750i 21"** (\$3,299 list, \$2,225 street), which outperformed the rest in our convergence tests and beat every monitor except the SuperMac SuperMatch 20•T Multimode in our composite image-quality tests.



The RasterOps 20T/Multiscan (top) took top honors among our two-page color monitors, and the SuperMac SuperMatch 20•T Multimode (bottom) was a big winner too. We also highly recommend the Radius PrecisionColor Display/20 (left) and the Nanao Flexscan F750i 21" (right).

— to see if any of the monitors exhibited problems in maintaining a stable, trouble-free on-screen image. All the monitors were free of trouble (and headaches).

Fountain of Hues

Image quality is only half the picture: Color quality is equally important. Our color-analyzer tests judge a monitor's ability to maintain spatial uniformity and evaluate color tracking and maximum usable brightness.

Good *spatial uniformity* means nearly equal brightness levels at all areas of the screen (all monitors tend to be brighter in the center). If your monitor is much brighter in one corner than anywhere else on-screen, the colors in that corner won't look right. You might make corrections to an image on-screen that don't turn out right when you print that image. Apple's monitor came out on top for spatial uniformity.

Color tracking is a measure of how

evenly the monitor's three electron guns illuminate the red, green, and blue phosphors on the inside of the screen. We use grays for this test, because grays ideally contain equal amounts of red, green, and blue. In a monitor with poor color tracking, the grays will contain too much or too little of one of these colors — for example, if the gun that fires at the green phosphor is more intense than those that fire at the red and blue phosphors, the grays will look a bit green. The color tracking on almost all the monitors ranged from very good to practically perfect.

Maximum usable brightness is a measure of how high you can turn up the brightness control without sacrificing sharpness. If you work in a brightly lit office, you'll want a monitor that can be adjusted to a very bright setting. In the brightness tests, all the monitors performed well, although they're generally not as bright as 16-inch monitors. In our tests, the

E-Machines T19 II was the brightest and the Apple Macintosh 21" Color Display was the dimmest.

A Final Look

In general, the differences in the test performances of these monitors were slight. Essentially, all of the monitors performed well, and any of them can be a good, general-purpose choice for viewing your work.

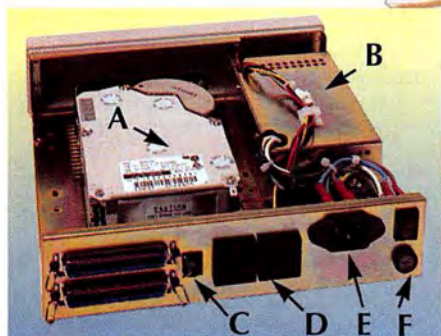
Before buying a monitor, go see it. Look at the display for a long while. Run your software with it. Specs and tests do you no good if you have trouble staring at the monitor for hours on end, and no other Mac peripheral can be judged as subjectively. For our objective views, see the "Bottom Line" sidebar.

Linda Jacobson is a San Francisco-based freelance writer. Her book *Cyberarts: Exploring Art and Technology* is published by Miller Freeman. Stephen Chan and Katherine Barnes, ZD Labs project leaders, managed the testing for this report.

continues ►

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HARDWARE THAT FITS

CIRCLE 92 ON READER SERVICE CARD.

Table 1: Features of Two-Page Color Monitors

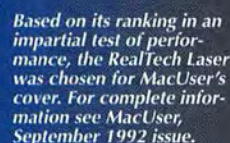
● = yes ○ = no	Apple Macintosh 21" Color Display \$\$\$½	E-Machines T19 II \$\$\$½	Hardware That Fits RealTech 20" Trinitron \$\$\$½	Ikegami CT-20D \$\$\$	Mitsubishi Diamond Pro 20 \$\$\$½
List price	\$3,599	\$2,999	\$1,895	\$3,495	\$2,999
Street price	\$3,395	\$2,350	\$1,895	\$2,410	\$2,600
Pros	Easy setup. Excellent spatial uniformity. Very low nuisance factor.	Easy setup. Good tech support.	Excellent price. 30-day money-back guarantee.	Good geometry score.	Good warranty. Good tech support.
Cons	Expensive. Low color-tracking score. Dimmest monitor.	Low spatial-uniformity score.	Manual doesn't mention Mac setup. Poor spatial-uniformity score.	Manual doesn't mention Mac setup. Low sharpness score. No Mac cable.	Low convergence score.
Specifications					
Tube type	shadow mask	Trinitron	Trinitron	Trinitron	shadow mask
Screen size (diagonal)	19.5 in.	19.5 in.	19.5 in.	19.5 in.	19 in.
Active-screen size (diagonal)	18.25 in.	19 in.	19 in.	19 in.	19 in.
Max. pixel dimensions (W x H)	1,152 x 870 pixels	1,152 x 870 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels
Horiz.-scan rate (min., max.)	68.7, 68.7 kHz	30, 71 kHz	30, 77 kHz	53, 81 kHz	30, 78 kHz
Vert.-scan rate (min., max.)	75, 75 Hz	50, 120 Hz	50, 90 Hz	50, 150 Hz	50, 130 Hz
Power consumption	165 watts	220 watts	170 watts	150 watts	155 watts
Case dimensions (W x D x H)	19.6 x 20.9 x 18.5 in.	19 x 20 x 19 in.	19.5 x 19.8 x 18 in.	19 x 20.5 x 19 in.	19 x 20.5 x 19 in.
Footprint	12.5 x 15 in.	11.75 x 11.75 in.	11.25 x 11.25 in.	13 in. diameter	11.5 x 11.5 in.
Weight	79.6 lb	70.1 lb	70 lb	85.1 lb	74.2 lb
Antiglare treatment	OCLI panel	silica AR coating	OCLI panel	AR panel	panel, tinted glass
Controls (type/location)					
Brightness/contrast	analog/front	digital/front	analog/side	analog/front	digital/front
Vert./horiz. position	○	digital/front	digital/side	analog/front	digital/front
Vert./horiz. size	○	digital/front	digital/side	analog/front	digital/front
Pincushioning	○	○	digital/side	○	○
Degaussing	back	automatic at startup	side	side	front
Color temperature	○	○	○	○	○
Input select	○	○	○	○	○
Vert./horiz. convergence	○	digital/front	○	analog/side	○
120/240-volt switch	automatic	automatic	automatic	manual	○
Power switch	back	front	side	front	front
Signal compatibility					
Apple etc., 21"	●	●	●	●	●
E-Machines T19	○	●	●	●	●
S'Mac/R'Ops 19" (60 Hz)	○	●	●	●	●
S'Mac/R'Ops 19" (75 Hz)	○	●	●	●	●
Radius Two-Page	○	●	●	●	●
Multifrequency/multimode	single mode	multifrequency	multifrequency	multifrequency	multifrequency
Other					
Mac cable/adaptor	●	●	●	○	●
Service site	dealer	dealer	direct	direct	direct/dealer
Warranty	1 yr	1 yr	1 yr	1 yr	2 yr
FCC certification	Class A	Class A	Class A*	Class A	Class A
Company					
	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 408-996-1010	E-Machines 9305 S.W. Gemini Dr. Beaverton, OR 97005 503-646-6699	Hardware That Fits 610 S. Frazier Conroe, TX 77301 800-364-9753 409-760-2400	Ikegami Electronics (USA) 37 Brook Ave. Maywood, NJ 07607 201-368-9171	Mitsubishi Electronics America, Inc. 5665 Plaza Dr. Cypress, CA 90630 800-843-2515 714-236-6159

*The monitor is certified as Class B to run at pixel dimensions of 1,024 x 768 pixels or less.

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— PUBLISH MAGAZINE.
February 1992

—MACWORLD MAGAZINE
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HARDWARE THAT FITS

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CIRCLE 93 ON READER SERVICE CARD.

Table 1: Features of Two-Page Color Monitors, continued

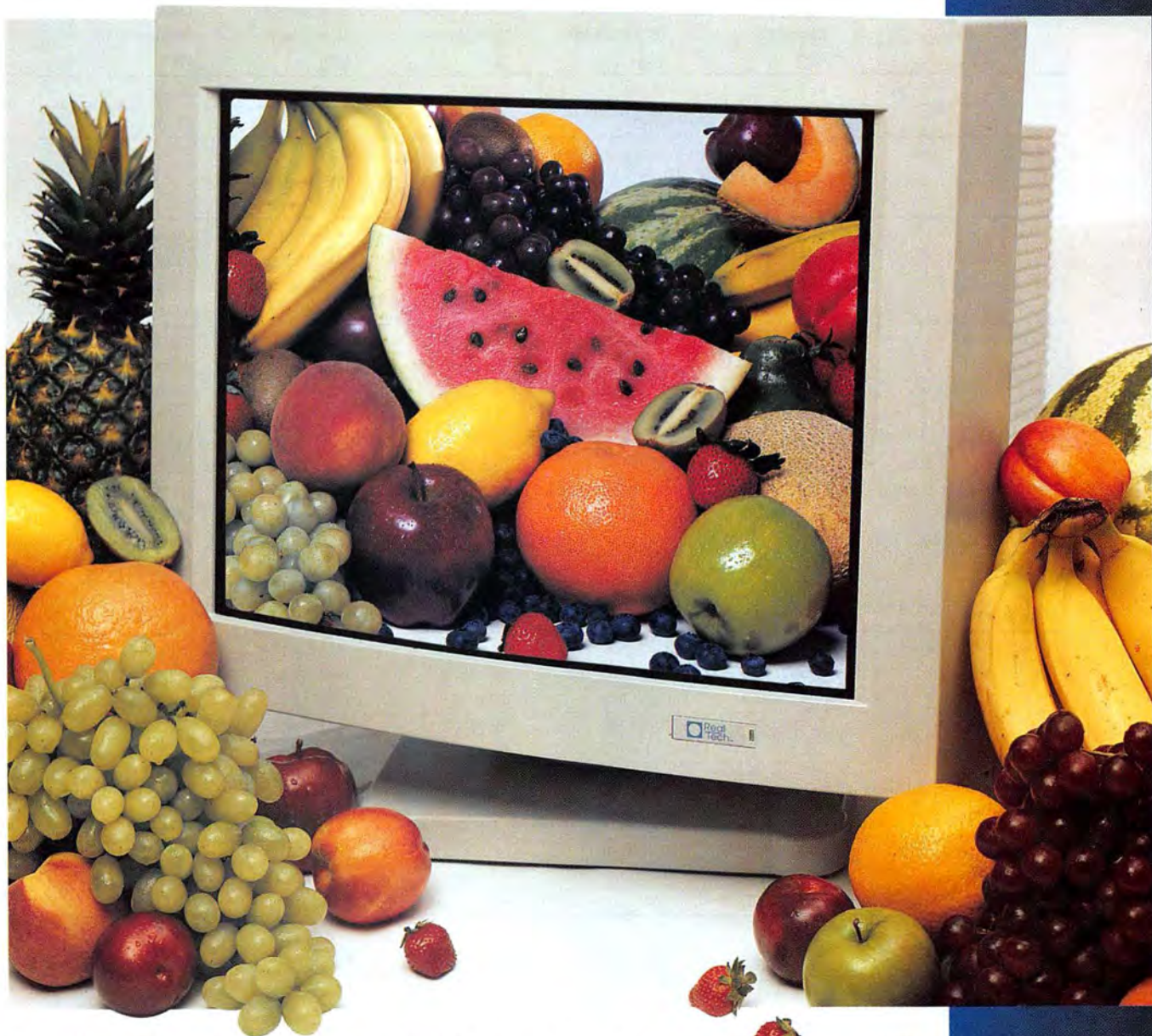
● = yes ○ = no	Nanao Flexscan F750i 21" ★★★★	Nanao Flexscan T660i 20" ★★★★½	NEC MultiSync 6FG ★★★★½	Philips Fast Refresh/20 ★★★★½	Pixelink PX20T ★★★★½
List price	\$3,299	\$3,999	\$2,899	\$2,995 [†]	\$3,295
Street price	\$2,225	\$2,560	\$2,400	\$2,850	\$1,900
Pros	Good street price. Easy setup. Good tech support.	Easy setup. Good tech support. Very low nuisance factor.	30-day money-back guarantee. Excellent documentation.	Good warranty. Good tech support.	Excellent street price. 30-day money-back guarantee.
Cons	Low sharpness score. Extra charge for Mac cable.	Low sharpness score. Extra charge for Mac cable.	Poor tech support.	Lowest geometry score.	Manual doesn't mention Mac setup. Low sharpness score. No Mac cable.
Specifications					
Tube type	shadow mask	Trinitron	shadow mask	Trinitron	Trinitron
Screen size (diagonal)	19.5 in.	19.5 in.	19.75 in.	18.75 in.	19.5 in.
Active-screen size (diagonal)	19.5 in.	19 in.	19.25 in.	18.75 in.	19 in.
Max. pixel dimensions (W x H)	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels
Horiz.-scan rate (min., max.)	30, 78 kHz	30, 80 kHz	27, 79 kHz	30, 82 kHz	30, 77 kHz
Vert.-scan rate (min., max.)	55, 90 Hz	55, 90 Hz	55, 90 Hz	50, 160 Hz	50, 90 Hz
Power consumption	160 watts	160 watts	170 watts	180 watts	150 watts
Case dimensions (W x D x H)	19.6 x 22.4 x 18.6 in.	19.3 x 20.5 x 19.2 in.	20.2 x 22.4 x 20.7 in.	19 x 21.5 x 18.5 in.	19.5 x 20.5 x 18.25 in.
Footprint	14.25 x 14.25 in.	14.25 x 14.25 in.	13.5 in. diameter	13 x 15.25 in. (oval)	11.25 x 11.25 in.
Weight	80.5 lb	81 lb	77.3 lb	80 lb	72 lb
Antiglare treatment	silica	AR panel	OCLI panel	HEA panel	AR, antistatic coating
Controls (type/location)					
Brightness/contrast	digital/front	digital/front	analog/front	digital/front	analog/side
Vert./horiz. position	digital/front	digital/front	digital/front	digital/front	digital/side
Vert./horiz. size	digital/front	digital/front	digital/front	digital/front	digital/side
Pincushioning	digital/front	digital/front	digital/front	○	digital/side
Degaussing	digital/front	digital/front	front	front	front
Color temperature	digital/front	digital/front	digital/front	digital/front	○
Input select	digital/front	digital/front	digital/front	digital/front	○
Vert./horiz. convergence	digital/front (horiz. only)	digital/front	○	digital/front	○
120/240-volt switch	○	○	○	automatic	automatic
Power switch	front	front	front	front	side
Signal compatibility					
Apple etc., 21"	●	●	●	●	●
E-Machines T19	●	●	●	●	●
S'Mac/R'Ops 19" (60 Hz)	●	●	●	●	●
S'Mac/R'Ops 19" (75 Hz)	●	●	●	●	●
Radius Two-Page	●	●	●	●	●
Multifrequency/multimode	multifrequency	multifrequency	multifrequency	multifrequency	multifrequency
Other					
Mac cable/adaptor	● (extra charge)	● (extra charge)	●	●	○
Service site	dealer	dealer	direct	direct	dealer/direct
Warranty	1 yr	1 yr	2 yr (parts), 1 yr (labor)	2 yr	1 yr
FCC certification	Class A	Class A	Class A	Class A	Class A*
Company					
	Nanao USA Corp. 23535 Telo Ave. Torrance, CA 90505 800-800-5202 310-325-5202	Nanao USA Corp. 23535 Telo Ave. Torrance, CA 90505 800-800-5202 310-325-5202	NEC Technologies, Inc. 1255 Michael Dr. Wood Dale, IL 60191 800-388-8888 708-860-9500	Philips One Philips Dr. Knoxville, TN 37914 800-835-3506 615-475-0317	Pixelink 8 Kane Industrial Dr. Hudson, MA 01749 508-562-4803

*The monitor is certified as Class B to run at pixel dimensions of 1,024 x 768 pixels or less.

[†]Just before we went to press, Philips reduced the list price to \$2,499.

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HARDWARE THAT FITS

CIRCLE 94 ON READER SERVICE CARD.

Table 1: Features of Two-Page Color Monitors, continued

● = yes ○ = no	Radius PrecisionColor Display/20 tttt	RasterOps 20T/Multiscan tttt	Seiko CM2070LR Color Monitor ttt½	Sony GDM-1936 20" Multiscan ttt½	SuperMac SuperMatch 20 Dual-Mode ttt½
List price	\$2,859	\$2,499 ^o	\$2,999	\$3,399	\$2,999
Street price	\$2,440	\$2,265	\$2,365	\$2,065	\$2,490
Pros	Easy setup. Excellent documentation and tech support.	Good price. 3-year warranty. Excellent tech support.	Good tech support.	Good price. Good warranty. Excellent sharpness score.	3-year warranty. Excellent documentation.
Cons	Second-dimmest monitor.	Manual doesn't mention Mac setup.	Manual doesn't provide much Mac info. Low sharpness score.	Poor tech support. Low convergence score. Low spatial-uniformity score.	Low spatial-uniformity score. Low convergence score.
Specifications					
Tube type	Trinitron	Trinitron	Trinitron	Trinitron	Trinitron
Screen size (diagonal)	19.5 in.	19.25 in.	19.5 in.	19.5 in.	19.5 in.
Active-screen size (diagonal)	19 in.	19 in.	19 in.	19 in.	17.7 in.
Max. pixel dimensions (W x H)	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,280 x 1,024 pixels	1,152 x 870 pixels
Horiz.-scan rate (min., max.)	30, 71 kHz	30, 71 kHz	30, 77 kHz	30, 71 kHz	60.24, 68.68 kHz
Vert.-scan rate (min., max.)	50, 120 Hz	50, 120 Hz	50, 90 Hz	50, 120 Hz	75, 75 Hz
Power consumption	140 watts	350 watts	180 watts	185 watts	220 watts
Case dimensions (W x D x H)	19 x 19.88 x 18.88 in.	19 x 19.88 x 18.88 in.	19.5 x 20.5 x 18.25 in.	18.63 x 19.5 x 19 in.	19 x 20 x 19 in.
Footprint	11.75 x 11.75 in.	11.75 x 11.75 in.	11.25 x 11.25 in.	11.75 x 11.75 in.	12 x 12 in.
Weight	69.8 lb	70 lb	73.4 lb	72.6 lb	71.5 lb
Antiglare treatment	bonded OCLI	OCLI panel	AR panel	AR coating	OCLI panel
Controls (type/location)					
Brightness/contrast	digital/front	digital/front	analog/side	digital/front	analog/front
Vert./horiz. position	digital/front	digital/front	digital/side	digital/front	analog/front (vert. only)
Vert./horiz. size	digital/front	digital/front	digital/side	digital/front	○
Pincushioning	○	○	digital/side	○	○
Degaussing	automatic at startup	automatic at startup	front	automatic at startup	automatic at startup
Color temperature	software controlled	○	○	○	○
Input select	○	○	○	○	○
Vert./horiz. convergence	digital/front	digital/front	○	digital/front	analog/front
120/240-volt switch	automatic	automatic	automatic	automatic	automatic
Power switch	front	front	side	front	front
Signal compatibility					
Apple etc., 21"	●	●	●	●	●
E-Machines T19	●	●	●	●	○
S'Mac/R'Ops 19" (60 Hz)	●	●	●	●	○
S'Mac/R'Ops 19" (75 Hz)	●	●	●	○	●
Radius Two-Page	●	●	●	●	○
Multifrequency/multimode	multifrequency	multifrequency	multifrequency	multifrequency	dual mode
Other					
Mac cable/adaptor	●	●	●	●	●
Service site	dealer	dealer	direct	dealer/direct	direct
Warranty	1 yr	3 yr	1 yr	1 yr (CRT, 2 yr)	3 yr
FCC certification	Class A	Class A	Class A*	Class A	Class A
Company					
	Radius, Inc. 1710 Fortune Dr. San Jose, CA 95131 800-227-2795 408-434-1010	RasterOps 2500 Walsh Ave. Santa Clara, CA 95051 800-729-2656 801-785-5750	Seiko Instruments USA 1130 Ringwood Ct. San Jose, CA 95131 408-922-5800	Sony America 655 River Oaks Pkwy. San Jose, CA 95134 800-352-7669	SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 800-334-3005 408-245-2202

*The monitor is certified as Class B to run at pixel dimensions of 1,024 x 768 pixels or less.

^oA color-calibrated version, the RasterOps CorrectColor 20/T, is available for \$3,999.

Our 11x17 printer is guaranteed to make you smile, too.



— MACWORLD MAGAZINE
September 1992

Jeanne is thrilled that she doesn't have to fiddle around and tape pages together anymore. No more tiling! No more cut-and-taped mockups!

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17" Multi-mode Monitor \$995.
15" Grayscale Monitor \$449.
Color 350 Color Printer \$5,995.
Scan 800 Color Scanner \$1,199.
Laser Printer \$1,595.

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"...be forewarned: PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."

Quote from MacUser September 1992 issue, "Personal PostScript Printers" by Bruce Fraser.

HARDWARE THAT FITS

CIRCLE 95 ON READER SERVICE CARD.

Table 1: Features, continued

● = yes ○ = no	SuperMac SuperMatch 20•T Multimode ††††	SuperMac SuperMatch 21 Two-Page Color Display †††½
List price	\$2,999	\$2,999
Street price	\$2,490	\$2,660
Pros	Easy setup. 3-year warranty. Excellent sharpness and geometry. Excellent documentation.	Easy setup. 3-year warranty. Excellent documentation.
Cons	Low color-tracking score.	Low spatial-uniformity score.
Specifications		
Tube type	Trinitron	shadow mask
Screen size (diagonal)	19.25 in.	20 in.
Active-screen size (diagonal)	17.7 in.	18.75 in.
Max. pixel dimensions (W x H)	1,152 x 910 pixels	1,152 x 870 pixels
Horiz.-scan rate (min., max.)	30, 71 kHz	68, 68 kHz
Vert.-scan rate (min., max.)	50, 85 Hz	75, 75 Hz
Power consumption	250 watts	145 watts
Case dimensions (W x D x H)	19 x 20 x 19 in.	19.2 x 20.4 x 18.4 in.
Footprint	12 x 12 in.	12 x 12.75 in.
Weight	71 lb	70.4 lb
Antiglare treatment	OCLI panel	OCLI panel
Controls (type/location)		
Brightness/contrast	digital/front	analog/front
Vert./horiz. position	digital/front	○
Vert./horiz. size	digital/front	○
Pincushioning	○	○
Degaussing	automatic at startup	front
Color temperature	○	○
Input select	○	○
Vert./horiz. convergence	digital/front	○
120/240-volt switch	automatic	manual
Power switch	front	front
Signal compatibility		
Apple etc., 21"	●	●
E-Machines T19	●	○
S'Mac/R'Ops 19" (60 Hz)	●	○
S'Mac/R'Ops 19" (75 Hz)	●	○
Radius Two-Page	●	○
Multifrequency/multimode	multifrequency	single mode
Other		
Mac cable/adaptor	●	●
Service site	direct	direct
Warranty	3 yr	3 yr
FCC certification	Class A	Class A
Company		
	SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 800-334-3005 408-245-2202	SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 800-334-3005 408-245-2202

Table 1 Criteria

List price — The vendor's retail price for the monitor.

Street price — The average price of the monitor at dealers surveyed across the U.S. in January 1992 or through mail order.

Tube type — What the tube has, a shadow mask or a Trinitron aperture grille.

Screen size (diagonal) — The length, diagonally, of the exposed glass face of the monitor, measured in inches.

Active-screen size (diagonal) — The length, diagonally, of the portion of the screen that lights up, measured in inches.

Max. pixel dimensions (W x H) — The maximum number of dots (pixels) that can be displayed on the screen, counting horizontally (width) and vertically (height).

Horiz.-scan rate (min., max.) — The minimum and maximum numbers of lines of pixels that can be written on the screen per second, measured in thousands of cycles per second (kilohertz).

Vert.-scan rate (min., max.) — The minimum and maximum rate at which the screen is redrawn from top to bottom, measured in cycles per second (hertz).

Power consumption — The maximum electrical-power requirement of the monitor, measured in watts.

Case dimensions (W x D x H) — The outside width, depth, and height of the monitor's plastic shell, measured in inches.

Footprint — The dimensions of the monitor's stand given as width times depth if the foot is square or as a diameter if the base is circular, measured in inches.

Antiglare treatment — The coating or transparent panel on the monitor screen, designed to eliminate or diffuse reflected light. The abbreviation *AR* denotes antireflective.

Controls (type/location) — Does the monitor have user controls for making adjustments? If it does have user controls, the type (digital or analog) and the location of the controls.

Signal compatibility — Does the monitor support the video standards listed here?

Mac cable/adaptor — Does the monitor come with a Mac cable?

Service site — Where you return the monitor for service: to a dealer or directly to the manufacturer.

FCC certification — The class of FCC certification. According to the FCC, Class A products should not be sold in the consumer market.

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eauty is in the eye — and the wallet — of the beholder. If your color-printing budget hovers in the low thousands, a page from a quality inkjet printer looks mighty good. Double or triple your investment, and you can gaze contentedly at the crisp, glossy output of a thermal-wax printer. It's not until you approach the rarefied world of five-figure finance that you — and your clients, customers, or audience — can begin to enjoy the pinnacle of printing performance: continuous-tone color images.

This trip up the ladder of color technology may well be worth it. If, for example, you're a desktop-publishing professional, the right continuous-tone color printer can provide you with substantial savings over traditional image- and color-management techniques. If you're a frequent user of such popular image-manipulation applications as Photoshop or ColorStudio, the photo-quality output of a continuous-tone

BY BRUCE FRASER

printer can give you unprecedented insight into your images. And if you use such visual tools as presentation transparencies or full-color storyboards to sell your ideas, a continuous-tone printer can arm you with persuasive materials that will wow the most discriminating audiences. Whatever color image you print, it will look better when it's printed by the appropriate continuous-tone printer.

Honest Quality

Printers lie. Most, for example, fool you into seeing green by sneaking a tiny yellow dot up close to a tiny blue one. Your eyes, deceived, blend the dots together, and instead of perceiving a steady pattern of blue and yellow dots, your brain tells you, "green." This tricky printing technique goes by the appropriately slippery-sounding name of *dithering* (see the "Dither and Tone" sidebar).

Whereas most color printers dupe you with dithers, continuous-tone printers use a more subtle subterfuge. Instead of clustering primary-

colored dots into eye-fooling patterns, most continuous-tone printers use *dye-sublimation* technology, which lays down a continuous grid of *pixels*, or picture elements. And whereas a dithering printer is limited to the four printing primary colors — cyan, magenta, yellow, and black — a dye-sublimation (often abbreviated as *dye-sub*) printer is able to make use of 16.7 million colors. There's no need to dither. You just have to be tricked into seeing each discrete pixel as part of a continuous blend of colors — and with nominal resolutions as high as 300 dpi (dots per inch), your eye is an easy mark. What's really a grid of different-colored dots is seen as a seamless blend: a continuous-tone image. The resulting image can seem as sharp as a well-focused photograph.

This quality isn't cheap, though. Not only is a continuous-tone printer a substantial investment (the printers in this report range from around \$9,000 to a little less than \$40,000) but also, at as much as \$6.50 per tabloid-sized page, each continuous-

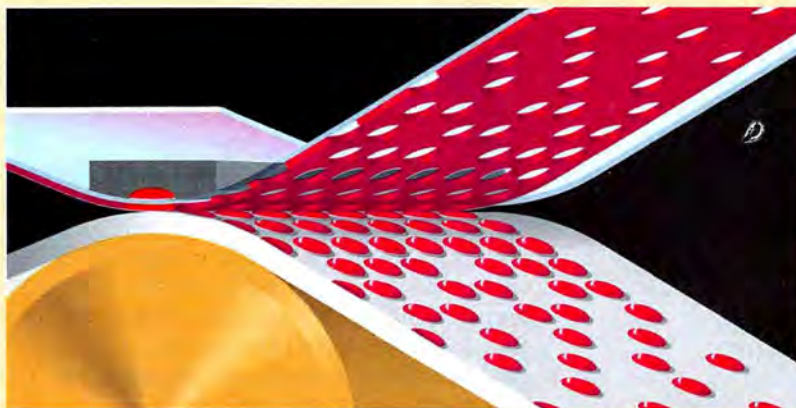
tone image is significantly more expensive than the \$1 that a page from a thermal-wax color printer costs or than the even lower price of a page from an inkjet printer. However, when you compare \$6.50 per page with the \$200-per-page cost of a tabloid-sized *Matchprint* (which desktop publishers use to *proof*, or check, color accuracy before an image is printed on a four-color press), a continuous-tone printer regains some of its luster.

But only a few continuous-tone printers can produce suitable substitutes for a *Matchprint*. Some are best suited for printing photo-quality images, and some shine brightest as creators of overhead transparencies. To find which best match your needs, we tested seven dye-sub printers: the GCC ColorTone, JVC 2200, Kodak XLT 7720, Mitsubishi ColorStream DS, Sony UP-D7000, Tektronix Phaser IIsd, and 3M Rainbow Desktop Proofer. Two other printers — the Mitsubishi DiamondColor S3600 and the RasterOps CorrectPrint 300 — were tested, but they've since been

Dither and Tone

Thermal-Wax Printing

The heating element in a thermal-wax print head melts colored wax from a ribbon onto paper. The wax is transferred by heat and mechanical pressure between the head and the platen roller. The paper is then separated from the ribbon. The unmelted wax remains on the ribbon, and the melted wax sticks to the paper.



Dithered Output

Most color printers lay down discernible dot patterns of cyan, magenta, yellow, and (sometimes) black to create an illusion of millions of colors. This method of creating colors is called dithering, and even the best thermal-wax or inkjet printers produce output that contains a quite obvious dot pattern.

Figure 1: Printing Proofs

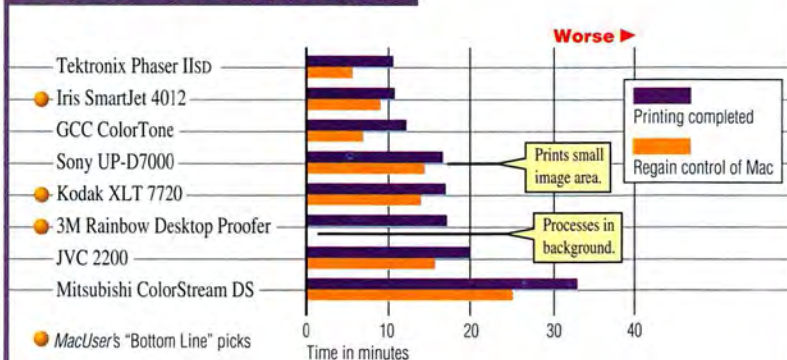


Figure 1: Patience is key, because there's really no such thing as a fast continuous-tone printer. In judging the speed of a continuous-tone printer, you should look for two things: how soon you regain control of your Mac and how long a page takes to print. The Tektronix Phaser IIsp turned in the shortest time, returning control of the Mac in a little more than five minutes.

removed from the market and will be replaced by new models (see the "On the Horizon" sidebar). We also tested the Iris SmartJet 4012 — an expensive, variable-dot-size inkjet printer that has long been the digital proofing standard. Even though the SmartJet 4012 is an inkjet printer,

the quality of its output is akin to that of a dye-sub printer, because it produces dots of various sizes.

Jack of Some Trades

With its vivid, photographlike color output, a continuous-tone printer can be the right choice for a

wide range of uses. Of course, some vendors would have you believe that this product class is the solution to *every* color-printing problem. We thought that this sounded too good to be true and decided to put this claim to the test. Our testing focused on the three areas we saw as leading uses of continuous-tone printers: desktop proofing, digital imaging, and business-presentation creation.

Desktop proofing is used for two purposes: for examining a layout to check the placement of all components of a page and for judging the accuracy of color reproduction. If, for example, you work at an ad agency, you may need to produce *advertising compositions* (commonly known as *ad comps*) for clients. A typical ad comp might include a color photo, an illustration or other artwork, and text, all arranged just as they should appear in the final product. If your final product will be produced by a professional printing press, you'll probably be proofing color PostScript pages to make sure that the colors are accurate and that

Dye-Sublimation Printing

When a subliminal dye is heated, it changes from a solid into a gas via a process called sublimation. The gaseous dye diffuses in the chemical coating on the paper and reverts to a solid. The amount of dye transferred depends on the temperature of the heating element.



Continuous-Tone Output

The intensity of each color can be varied, because subliminal dyes are laid on top of each other; dithering is not required to create the full range of colors.

everything looks right before going to press.

If you're planning to use a continuous-tone printer for outputting digital images, you might be dealing with color pictures you've scanned into your Mac and manipulated with an application such as Adobe Photoshop. In effect, the Mac, the software, and the printer play the role of a photographer's darkroom. In such a case, the pages you print are your final output.

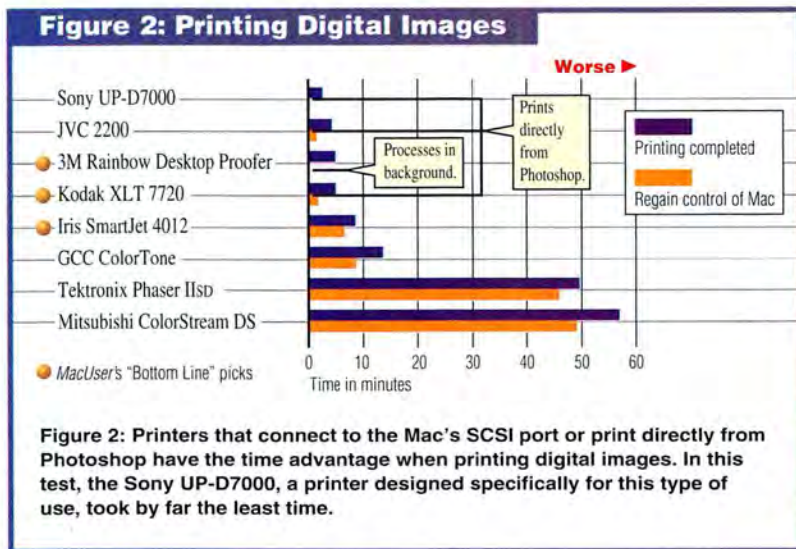
And when you use one of these printers to produce high-quality materials for business presentations — overhead transparencies for a sales presentation, for instance — the printer again provides your final product.

What's It Gonna Cost?

Continuous-tone printers aren't cheap, either to buy or to operate. But prices have fallen dramatically since Du Pont introduced the now-discontinued 4CAST four years ago. The highest-priced printer we tested, the Iris SmartJet 4012, retails for \$39,000, but three of our test printers retail for less than \$10,000 (see Table 1).

With such prices, you're asking, why would you want a continuous-tone printer? Compare the benefits of producing your own proofs instead of ordering commercial Matchprints. As already mentioned, a per-page cost of \$6.50 for a tabloid-sized, continuous-tone proof compares very favorably with the \$200 cost of a commercially produced tabloid-sized Matchprint.

But there are some caveats if you're going to use a dye-sub printer as a proofing device. First, because the dye-sub process doesn't produce a dither pattern, you won't be able to detect moirés and other screening artifacts that might emerge later from the printing press, which does lay down dots. Also, the pigments used in any printer aren't exactly the same color as the inks used in four-color printing. You'll need color-matching



software to compensate and give you a good match for the color you'll actually get from the press.

Cropping Out

If you want to print full-bleed documents (images that run all the

way to the edges of the paper), think again. A continuous-tone-printer engine needs a generous paper margin for moving the paper through the printer, because the engine grips the paper by the edges. The image area is therefore always significantly

On the Horizon

Several vendors have recently announced products that should take continuous-tone-printing technology further than ever. RasterOps, the company that pioneered low-cost dye-sub printers with its CorrectPrint 300, has replaced that model with the \$9,999 CorrectPrint 300i. The CorrectPrint 300i ships with 36 megabytes of RAM, a 33-megahertz RISC processor, and new color tables for better color accuracy. RasterOps Corp., 2500 Walsh Avenue, Santa Clara, CA 95051; 800-756-2656 or 408-562-4200.

SuperMac is moving into the printer market with two ProofPositive printers. The smaller model, the ProofPositive Full-Page Printer, can image a full-bleed letter-sized page, whereas the larger, the ProofPositive Two-Page Printer, handles full-bleed tabloid-sized paper. Both printers are aimed squarely at the desktop-proofing market and feature color-management software from Electronics for Imaging. SuperMac offers two interface options, either a NuBus Centronics parallel adapter or a SCSI interface.

Each SuperMac printer also features

the new Adobe PostScript Level 2 CPSI (Configurable PostScript Software Interpreter) RIP and a Shinko engine. But unlike with printers based on other types of Shinko engines, both models feature factory-installed calibration in ROM to compensate for manufacturing irregularities in the print head. Prices start at \$6,999 for the ProofPositive Full-Page Printer without RIP software. Prices for a full system, including the Adobe Level 2 CPSI RIP, are \$9,999 (NuBus interface) and \$10,499 (SCSI interface) for the ProofPositive Full-Page Printer and \$19,499 (NuBus interface) and \$19,999 (SCSI interface) for the ProofPositive Two-Page Printer. SuperMac Technology, Inc., 485 Potrero Avenue, Sunnyvale, CA 94086; 800-334-3005 or 408-245-2202.

Seiko has announced the Professional ColorPoint PSH, a \$9,999 PostScript-compatible printer that can print full-bleed letter-sized images on B4 media. The printer has LocalTalk, high-speed Centronics, and RS-232C serial interfaces, with optional Ethernet TCP/IP and Novell connections. All ports can be active simultaneously, but users can

Figure 3: Printing Transparencies

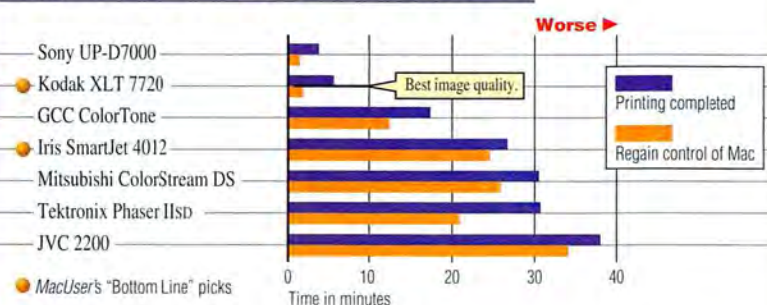


Figure 3: Proving that speed doesn't count: Although the Sony UP-D7000 was the fastest when printing our Persuasion transparency, it was first runner-up Kodak XLT 7720 that printed the best-looking transparency. The next-fastest printer, the GCC ColorTone, took three times as long and gave lackluster image-quality results. Note that the 3M Rainbow Desktop Proofer cannot produce transparencies.

smaller than the paper size. Only the 3M Rainbow Desktop Proofer is capable of printing a full-bleed tabloid-sized page, although the Iris SmartJet 4012 comes very close, with an image area of 10.6 x 17.2 inches. The JVC 2200 and the Mitsubishi

ColorStream DS can image full-bleed letter-sized pages, although the JVC 2200 requires tabloid-sized paper to do so, which makes it expensive to operate.

The remaining printers have image areas that are smaller than full

letter size. The GCC ColorTone and the Tektronix Phaser IIsd, which use the same model of Sharp engine, can image 8.1 x 10.8 inches on legal-sized paper, and the Kodak XLT 7720 can print 10 x 10 inches on 11-x-11-inch paper. The Sony UP-D7000, which can accommodate only letter-sized paper, has the smallest image area — 7.825 x 9.125 inches. This alone clearly makes the Sony printer unsuitable as a proofing device.

Matching Test

To see whether these printers could deliver accurate color PostScript output for proofing, we created our own ad comp — a complex letter-sized page — using QuarkXPress 3.0. (See the “How We Tested Continuous-Tone Printers” sidebar for samples of our test documents.) In addition to text in various colors, the page contained a colored background, a scanned photo, and several PostScript graphics created with Adobe Illustrator. The purpose of the test was twofold. First, we timed how long it took the printer to produce the page (see Figure 1). We then asked a panel of experts to compare the resulting page with a commercially produced Matchprint.

Two printers — the Iris SmartJet 4012 and the 3M Rainbow Desktop Proofer — did well. The SmartJet 4012's output was slightly closer to the Matchprint than the Rainbow Desktop Proofer's was, but the difference was so minor that we couldn't say definitively which one would more closely match the actual press output you'd get.

All the other printers had trouble matching the color on various elements of the page, the background screen in particular. The color-matching software available with the printers we tested seems to lag behind the hardware. The printers have wide enough color gamuts to simulate four-color-process printing, but the current color tables simply don't provide an accurate enough match.

selectively enable or disable ports to free up RAM for other port or image buffers. The Professional ColorPoint PSH also features programmable flash ROMs for easy upgrades. Seiko Instruments USA, Inc., 1130 Ringwood Court, San Jose, CA 95131; 800-888-0817 or 408-922-5900.

Mitsubishi Electronics has replaced its DiamondColor S3600, which featured an external hardware RIP, with the Mitsubishi S3600-30U. The QuickDraw version of the printer is priced at \$8,995. A PostScript-compatible version of the printer (\$10,995) features an internal Quintar hardware RIP that uses the PowerPage PostScript interpreter, from Pipeline Associates. The base-level configuration is 14 megabytes of RAM (upgradable to 38 megabytes) and a 60-megabyte hard drive, which can be used for image processing as well as for font storage. Mitsubishi Electronics America, 5665 Plaza Drive, Cypress, CA 90630; 800-843-2515 or 714-220-2500.

The Kodak XL 7700 series of printers will soon have the option of an Adobe PostScript Level 2 RIP running on a NuBus card. The \$5,995 CZAR Mac III,

from Integrated Device Technology, is a complete RISC CPU on a NuBus card that the vendor claims offers performance comparable with that of a Sun SPARCstation 2. Pricing for the CPSI RIP software had yet to be determined at press time. Several software options will also be available. Eastman Kodak Co., 343 State Street, Rochester, NY 14650; 800-445-6325 or 716-724-1021.

Finally, the release of Apple's ColorSync color-management system is likely to have an impact on the continuous-tone-printer market. Although Apple's default color-matching methods will probably prove too crude to produce good results with continuous-tone printers, more-sophisticated color-management systems such as Electronics for Imaging's EfiColor and Kodak's KCMS can transparently plug in to the ColorSync architecture. We expect that some continuous-tone-printer vendors will enter into agreements with EFI and Kodak to provide printer device profiles, which — when employed with the appropriate color-management system — should result in dramatically improved color fidelity.

You Wanna Be in Pictures?

In our second test, we used the printers to emulate a photographer's darkroom. We made a high-resolution RGB (red, green, blue) scan of a stock image containing a wide range of tones as well as very saturated colors. Then we sent the image to each printer, using the widest range of color possible. Our jury compared the results with the original photograph and with a Matchprint made from the scan.

Output that's ideal for proofing isn't necessarily the best for digital imaging. For proofing, the output must match a Matchprint to provide the best guide to what you'd get from a printing press. For producing photographic images, you want the maximum range of tone and saturation a continuous-tone printer can deliver, rather than the narrower gamut of a four-color printing press.

Figure 4: For the Match



Figure 4: Output from the Iris SmartJet 4012 came closest to matching the commercial Matchprint. Output from the Sony UP-D7000 was way off the mark, because the printer wasn't designed for this type of work.

We found that although a fast PostScript RIP (see the "RIP in Peace" sidebar) is a boon when you're printing PostScript pages,

PostScript itself is a hindrance when you're printing photographic-quality images. The rasterized image must be converted to PostScript code, sent

How We Tested Continuous-Tone Printers

During our preliminary research, we found that continuous-tone printers are designed for three types of use: proofing PostScript pages, printing digital images, and creating materials for business presentations. Some are good for just one use, whereas others do well at two or all three. Our tests therefore had to include documents that would tax each printer's specialty.

To ensure consistency, we standardized on several factors: We used a Quadra 700 running System 7.0.1 with

Tune-Up 1.1.1 and four 16-megabyte SIMMs provided by Newer Technology, for a total configuration of 68 megabytes. We used a PLI 1-gigabyte hard drive formatted with FWB's Hard Disk ToolKit and a Nanao Flexscan T560i 17-inch color monitor running off the Quadra's built-in video. We set the Mac's system with 32-bit addressing on, a disk cache of 512K, background printing off, and millions of colors.

Each printer was configured to ensure the best possible results. All Sharp-

engine-based printers were connected to the Mac via Ethernet, which allowed for Chooser-level printing. The printers with software RIPs were connected via their SCSI ports.

We performed each test three times, using a stopwatch to record how long the Mac was tied up and how long each document took to print. For the printers with software RIPs, we used the vendor-recommended RAM allocation. We also repeated some tests with 60 megabytes of RAM. 3M recommends using a



To test whether these printers could be used for proofing documents that would ultimately go to a printing press, we designed a mock-up of an advertising composition, using QuarkXPress. We then printed the page on each printer and compared the output with a commercially produced Matchprint.



We printed a photo image with sharp, saturated colors to test imaging abilities.

to the RIP, and then converted back into raster form before being imaged by the engine. The printers we tested that connect directly to the Mac's SCSI port had the advantage here. Most of them enable you to bypass the software PostScript RIPs entirely and print the image directly from Photoshop.

The Sony UP-D7000 was the fastest, followed by the JVC 2200 and then the 3M Rainbow Desktop Proofer and the Kodak XLT 7720, which were almost neck and neck (see Figure 2). The Iris SmartJet 4012, although it connects to your Mac via SCSI, has no facility for bypassing the PostScript RIP and hence was much slower. The Tektronix Phaser IISD was surprisingly slow, and the Mitsubishi ColorStream DS, because of its reliance on LocalTalk, was the slowest of the lot in this test.

What About Dots?

Because this group of printers deals with continuous tone rather than with dither patterns, dpi ratings quoted by printer manufacturers mean little. Our jury found that the 203-dpi Kodak XLT 7720 produced a sharper photographic image — with detail even in the very saturated areas — than any of the 300-dpi printers we tested. We couldn't completely explain this (nor could Kodak), but one likely factor is that this is the only printer we tested whose manufacturer also makes the consumables. The paper used by the Kodak XLT 7720, which resembles heavy photo paper right down to the Kodak watermark on the back, gives the Kodak output more of a photo look and feel.

The performance of the 163-dpi Sony UP-D7000 on the digital-imaging test further emphasizes how unimportant dpi ratings actually are

in continuous-tone printing. The UP-D7000's low resolution, which was painfully obvious on the page used in the proofing test, seemed to have no effect on the sharpness of the photographic image. The UP-D7000 beat the 300-dpi printers both in sharpness and in color saturation.

At the other extreme, the 300-dpi Sharp engine in the GCC ColorTone and the Tektronix Phaser IISD printers didn't live up to its name — the images were noticeably softer than those from the lower-resolution Kodak and Sony printers. The jury also disliked the paper used by the GCC and Tektronix printers. It's very thin and flimsy — almost like fax paper — and is not completely opaque. The paper used by other printers isn't as heavy as Kodak's but feels superior to that used by the printers with Sharp engines.

See Right Through It

Over the years, you've probably endured enough sales presentations to know that the overhead transparency has a tighter grip on corporate America than the Democrats have on Congress. It seems that everyone uses transparencies, and you might want to create them in-house on your own continuous-tone printer. For our third and final performance test, we created an Aldus Persuasion file and printed it as a transparency for overhead projection. Our jury then examined the result for the vividness of the colors and for the sharpness of the text and details.

In this test, the Kodak XLT 7720 was the undisputed champ. Not only did the transparency it produced look sharper and much more vivid than the transparencies produced by the other printers but the Kodak XLT 7720 also printed very quickly (see Figure 3). Only the Sony UP-D7000 was faster, but the quality of its transparency was much poorer. The next-fastest printer, the GCC ColorTone, took three times as long as the Kodak XLT 7720 and delivered lackluster results.

Quadra 900 or 950 with 90 megabytes of RAM with its printer. Because the Quadra 700 is limited to 68 megabytes of RAM, we allocated 60 megabytes to the 3M Rainbow Desktop Proofer's software RIP. For many of the printers that have software RIPs, we converted the test files to PostScript code.

We used a suite of documents designed to simulate typical user requirements and to highlight various aspects of printer performance. First, to test the ability to produce proofs, we designed

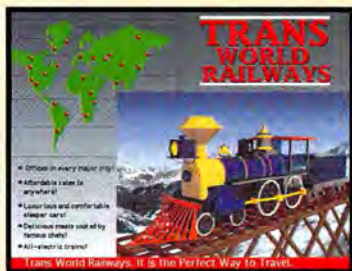
an ad comp with QuarkXPress 3.0. To test the processing power of the printers, the file contained downloadable fonts, EPS images, and a large CMYK TIFF photographic image.

For digital imaging, we used a stock photo supplied by Stephen Green-Armytage, of The Stock Market. The 21-megabyte, 300-dpi photo was printed from Adobe Photoshop 2.0.1. Whenever possible, we used the vendor's supplied direct-export Photoshop plugin. The document's resolution was adjusted to match the lower resolutions of the Kodak XLT 7720 (203 dpi) and the Sony UP-D7000 (163 dpi). The results from printing this file showed that the color gamuts of most of the printers far exceeded that of a Matchprint.

Finally, for our transparency test, we used an image created with Aldus Persuasion 2.0. This file, supplied by Electric Image, included colored text and images.

All the print samples were evaluated by a jury for overall quality. Both the ad comp and the photo image were compared with commercially produced Matchprints of the same images. The transparencies were viewed with an overhead projector and judged for quality and color saturation.

— Roman Victor Loyola



Finally, we ran perhaps the most important test for business users: printing an overhead transparency that included complex colored text and images.

Rating Tech Support

We made anonymous calls to each of the vendors represented in this report to determine what kind of service consumers get after purchasing a continuous-tone printer. The important issues were whether we reached a technical-support representative immediately; whether we were left on hold (and for how long); whether we had to leave a message and be called back (and how long that took); and, of course, whether our question was answered correctly.

Mitsubishi and 3M provided good tech support, offering the correct response to our question in the shortest time. We're not certain that Sony even *has* a technical-support department.

Our question and the correct answer were as follows:

Q. I'm trying to fit a letter-sized document onto a page, but the image gets cut off. How do I fix that?

A. Adjust the image and paper settings within the application.



GCC Technologies

Iris Graphics

JVC

Eastman Kodak

Mitsubishi International

Sony

Tektronix

3M

RIP in Peace

A trend highlighted by this report — one that is likely to increase — is the move of printer vendors to software RIPs (raster-image processors). There are major disadvantages associated with such a move, not the least being higher costs and lower printing speeds. However, hardware RIPs also have significant disadvantages.

First, hardware RIPs take a long time to design and bring to market, because they're difficult to upgrade as new revisions of PostScript become available. At the minimum, a ROM upgrade is necessary, but as more vendors use custom ASICs (application-specific integrated circuits) to offload tasks from the RIP's main processor, it sometimes makes more sense to redesign the RIP entirely, which, of course, takes longer.

Second, because of the increasing pace of technical innovation, hardware RIPs become obsolete quickly. A hardware RIP probably won't ever run faster than it did the day it was built. Increasing the amount of RAM in your Mac can give a performance boost, but hardware RIPs are designed around specific processors. Even if it were possible to upgrade the processor chip, other elements such as network interfaces would likely bog down the new, faster chip. In any case, the processor chip in most RIPs is soldered directly onto the motherboard. Using socketed chips would add to the expense, with uncertain benefits.

Software RIPs, in contrast, are inherently upgradable. When there's a new version of PostScript, you simply load it

from disks or perhaps from CD-ROMs. To run the RIP faster, just buy a faster Mac. A less obvious benefit that applies particularly to dye-sub printers is that you can bypass a software RIP when you want to print images from certain applications — such as Photoshop — which already have the image in raster format. Printing images through PostScript entails converting the raster image to PostScript code, sending it to the RIP, and then having the RIP convert it once more to raster format — a round-about process.

In production situations, a dedicated Mac driving a software RIP can also act as a spooler, freeing up the host Mac for other tasks. The software RIPs supplied with the Iris SmartJet 4012 and the 3M Rainbow Desktop Proofer include spooling features. A Mac running a software RIP can also be used to drive multiple printers, although this can lead to a production bottleneck. A more likely scenario as desktop-computer prices fall is multiple RIPs driving one relatively expensive output device at a speed as close to engine speed as possible.

Most of the cost of continuous-tone printers is in their engines, so it doesn't make a lot of sense to hamper their performance with a hardware RIP that may quickly become out-of-date. We expect to see many more color printers, particularly at the high end, use software rather than hardware RIPs. A clear upgrade path is always desirable and particularly so with devices in this price range.

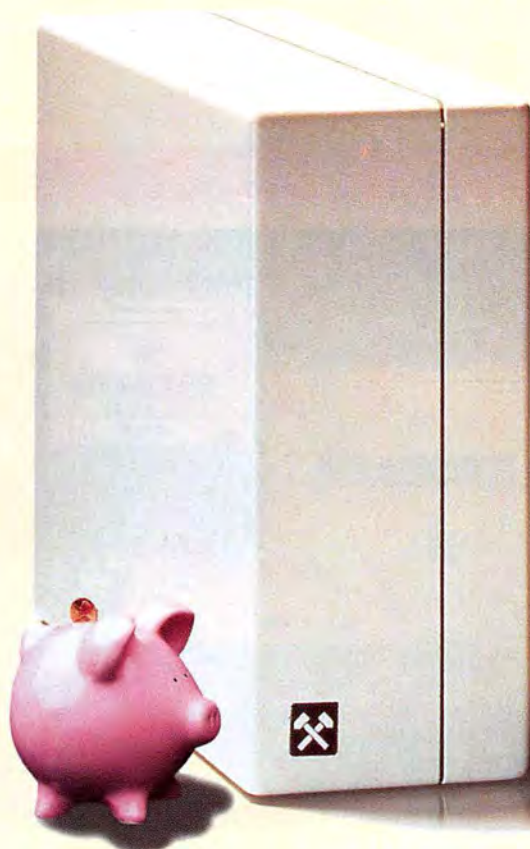
The Tektronix Phaser IISD was the second-slowest, but it provided image quality second only to that of the Kodak printer. This is because, when printing transparencies, the Tektronix Phaser IISD's engine slows down to allow more color saturation. GCC is now offering a similar enhancement for the ColorTone, which makes its transparencies rival those of the Phaser IISD, albeit with a similar speed penalty (the enhancement arrived too late for our testing).

As we expected, the Iris SmartJet 4012 didn't do well on our transparency test — it simply isn't designed for this use. The 3M Rainbow Desktop Proofer doesn't produce transparencies, although 3M is promising to provide transparency support in the future.

It Doesn't Come Cheap

Chances are, once you've seen a photographic-quality continuous-tone page, you won't believe that it came out of a printer. But although pleasing to the eye, continuous-tone printing is not for everyone. And the outstanding printers in this report were also the most expensive.

The Tektronix Phaser IISD and the GCC ColorTone printers, list-priced at \$9,995 and \$10,999, respectively, hold promise for the future. But at the moment, they simply don't print



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The Bottom Line

A continuous-tone printer is a major investment, but if you buy the right one for the right job, your investment can reap substantial benefits. All the printers we tested produced good-looking color output, but considering their cost, to buy and to run, they have to do more than just make pretty pictures.

For accurate desktop color proofing, the **Iris SmartJet 4012** (\$39,000 direct) and the **3M Rainbow Desktop Proofer** (\$19,500 list, \$19,250 street) were the only real contenders. The Iris printer is much less expensive to run than is the 3M Rainbow Desktop Proofer — the cost of a tabloid-sized SmartJet 4012 proof varies from \$.93 to \$3.20, depending on the type of paper you use, compared with \$6.80 for a Rainbow Desktop Proofer proof. The Iris printer also gives you the option of using many kinds of paper stock, so you have a much better chance of matching the paper that will actually be used for the final print job.

The **Kodak XLT 7720** (\$24,895 list, \$19,525 street) was the undisputed champ for printing photographs, producing sharp images with excellent color saturation and dense blacks, even though it's only a three-color printer (cyan, magenta, and yellow — no black). It also produced by far the best transparencies, with color that was vibrant yet allowed plenty of light to pass through. As a desktop proofing device, though, it exhibited severe shortcomings.



Top honors are shared by the Kodak XLT 7720 (right), for its impressive performance in the digital-imaging and transparency tests, and the 3M Rainbow Desktop Proofer (center), a good choice for desktop proofing. The Iris SmartJet 4012 (left) gives a slightly closer match to a commercial Matchprint.

accurate color. Their flimsy paper won't endear them to photographers either. However, with the advent of color-management systems from Electronics for Imaging; Kodak; and, of course, Apple itself, the color accuracy of these printers may improve immeasurably in the coming months. At present, it simply isn't there.

What is there is a promise of better color than you've ever seen from a desktop printer. But if you were to demand *accurate* color from most of the printers, the initial thrill would likely dissipate pretty quickly. For the time being, if you want excellence in continuous-tone printing, you're going to have to pay a hefty price. Check out our recommendations in the "Bottom Line" sidebar.

Bruce Fraser is an author, consultant, and *MacUser* contributing editor. Tony A. Bojorquez, a project leader at MacUser Labs, managed the testing for this report.

Table 1 Criteria

List price — The vendor's suggested retail price for the printer in its standard configuration.

Street price — The average price of the printer through mail order or at dealers surveyed across the U.S. in January 1993.

PostScript version — The version of Adobe's PostScript page-description language or the PostScript clone used in the printer's RIP.

RIP type — Whether the RIP (raster-image processor) is in the form of hardware or software.

Engine — The resolution and the manufacturer of the engine that is used in the printer.

Microprocessor, speed — The processor that powers the printer and its clock speed, in megahertz.

Memory (standard/max.) — The minimum and maximum amounts of on-board memory the printer can accommodate, in megabytes.

Host-to-printer interfaces — Interfaces, other than LocalTalk, for connecting with Macs or PCs.

Hard-drive interface — Whether the printer provides a SCSI port for connecting a hard drive.

Printer drivers — The software the Mac uses to convert information to PostScript before sending the file to the printer.

Color-matching software — The software that comes with the printer for ensuring that input, display, and output colors match.

No. of trays/capacity — The number of paper-input trays and the number of sheets of paper each can hold.

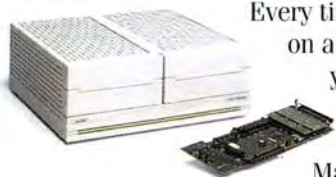
Paper formats/image area — The sizes of paper the printer can handle and the sizes of the corresponding image areas, in inches.

continues ►

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Table 1: Features of Continuous-Tone Printers

				
	GCC ColorTone \$\$\$	Iris SmartJet 4012 \$\$\$\$	JVC 2200 \$\$	Kodak XLT 7720 \$\$\$\$
List price	\$10,999	\$39,000	\$19,950	\$24,895
Street price	\$9,275	\$39,000 (direct)	\$19,050	\$19,525
Pros	Fair tech support.	Best desktop proofing. Inexpensive media.	Sharp color.	Best photo imaging, detail, and transparencies.
Cons	Poor transparencies. Poor Matchprints. Flimsy paper.	Expensive. Bulky. Loud.	Poor transparencies. Poor Matchprints. Dull photo images. Expensive media.	Expensive. No paper-output tray. Large.
Specifications				
PostScript version	PhoenixPage Level 1	Iris SmartJet VIP Level 1	Freedom of Press (FOP) Professional Level 1	VBS Kodak Output Manager
RIP type	hardware/software	software	software	software
Engine	300-dpi Sharp	300-dpi Iris	300-dpi JVC	203-dpi Kodak
Microprocessor, speed	AMD 29050, 25 MHz	uses Mac's processor	uses Mac's processor	uses Mac's processor
Memory (standard/max.)	16 MB/64 MB	4-MB input buffer	48 MB/48 MB	12-MB input buffer
Host-to-printer interfaces	Ethernet, parallel, serial	SCSI	SCSI	SCSI
Hard-drive interface	yes	no	no	no
Software				
Printer drivers	ColorTone LaserWriter	LaserWriter	LaserWriter, Photoshop (direct export)	LaserWriter, Photoshop (direct export), QuickDraw
Color-matching software	none	Iris Precision Color	none	none
Paper handling				
No. of trays/capacity	1/50 sheets	1/50 sheets	1/50 sheets	1/100 sheets
Paper formats/image area	ltr./8.1 x 8.6 in., lgl./8.1 x 10.8 in.	12 x 18 in./10.6 x 17.2 in.	ltr./10.24 x 10.24 in.	ltr./7.56 x 10.08 in., 11 x 11 in./10 x 10 in.
Consumables				
Cost per letter-sized page	\$2.25 (3-color), \$3.43 (4-color)	\$1.20 (matte) (4-color only)	\$4.50 (ltr.) (4-color only)	\$3.85 (3-color only)
Cost of paper/sheets	\$169/200	\$185/200 (matte)	\$450/100 ltr.	\$360/200
Cost of transparencies/sheets	\$199/100	\$160/100	\$600/100	\$200/200
Cost of ribbon/sheets/type	\$199/100/3-color, \$299/100/4-color	\$108/405/4-color	incl. in media price	\$285/100/3-color
Other				
Dimensions (L x W x H)	17.5 x 17.2 x 13.4 in.	31.8 x 20.5 x 37.1 in.	22.7 x 20.7 x 14 in.	24 x 20 x 15 in.
Weight	73 lb	225 lb	100 lb	130 lb
Warranty	1 year	90 days (parts and labor)	6 months	90 days
Extended warranty (cost/year)	\$699	none	varies by region	\$2,495*
Company	GCC Technologies, Inc. 209 Burlington Rd. Bedford, MA 01730 800-422-7777 617-275-5800 617-275-1115 (fax)	Iris Graphics, Inc. 6 Crosby Dr. Bedford, MA 01730 800-947-4712 617-276-5383 617-275-8590 (fax)	JVC, Inc. 19900 Beach Blvd., Ste. 1 Huntington Beach, CA 92648 714-965-2610 714-968-9071 (fax)	Eastman Kodak Co. 343 State St. Rochester, NY 14650 800-445-6325 716-724-1021 716-724-5629 (fax)

* Cost listed is for service 0 – 50 miles from depot; 51 – 100 miles is \$2,745, and 101 – 150 miles is \$2,995.

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HP LaserJet IIIIP
\$1895



DECtaser II52
\$1199







Apple LaserWriter NTR
\$1695

Standard Features	DECtaser II52	HP® LaserJet® IIIIP	Apple LaserWriter® NTR	Apple LaserWriter Select 310
PostScript Level 2	YES	Yes	Yes	No
AppleTalk	YES	Yes	Yes	No
Resident PostScript Fonts	17	35	35	13
Simultaneously Active Ports	YES	No	Yes	No
List Price	\$1,199	\$1,895	\$1,695	\$1,079

No matter what the competition says about our DECtaser™ II52, you'll swear by it. Call 1-800-DECINFO, ext. 848 to place your order or get the name of your local **digital**™ distributor.

Table 1: Features of Continuous-Tone Printers, continued

				
	Mitsubishi ColorStream DS ††	Sony UP-D7000 ††½	Tektronix Phaser IIso †††	3M Rainbow Desktop Proofer ††††
List price	\$9,950	\$8,995	\$9,995	\$19,500
Street price	\$8,875	\$8,995 (direct)	\$9,050	\$19,250
Pros	Good photo detail. Good tech support.	Very good photo images.	Very good transparencies. Good tech support.	Excellent for proofing. Good tech support.
Cons	Poor transparencies. Poor Matchprints. LocalTalk only, for Mac.	Poor transparencies. Poor Matchprints. Dismal tech support. Letter-sized only.	Poor Matchprints. Flimsy media. Slow printing photo images.	Doesn't print transparencies. Needs lots of RAM.
Specifications				
PostScript version	Pipeline Level 1	Freedom of Press Professional Level 1	Adobe Level 1	3M Rainbow Level 1
RIP type	hardware (ROM card)	software	hardware	software
Engine	300-dpi Shinko	163-dpi Sony	300-dpi Sharp	300-dpi custom
Microprocessor, speed	AMD 29050, 25 MHz	uses Mac's processor	AMD 29000, 24 MHz	uses Mac's processor
Memory (standard/max.)	14 MB/38 MB	24 MB	16 MB/64 MB	20-MB input buffer
Host-to-printer interfaces	parallel, serial	SCSI	Ethernet, parallel	SCSI
Hard-drive interface	yes	no	yes	no
Software				
Printer drivers	ColorStream DS, LaserWriter	ColorOut, Photoshop (direct export)	Phaser IIso	LaserWriter (can output CMYK Photoshop files directly)
Color-matching software	none	none	TekColor PS	3M Rainbow Color Targets
Paper handling				
No. of trays/capacity	1/50 sheets	1/50 sheets	1/50 sheets	1/60 sheets
Paper formats/image area	ltr./8.21 x 9.31 in., super A/8.5 x 12.3 in.	ltr./7.825 x 9.125 in.	ltr./8.1 x 8.6 in., lgl./8.1 x 10.8 in.	12 x 18 in./11.9 x 17.2 in.
Consumables				
Cost per letter-sized page	\$2.50 (3-color), \$4.10 (4-color)	\$2.50 (3-color only)	\$2.25 (3-color), \$2.75 (4-color)	\$6.80 (11 x 17 in.) (4-color only)
Cost of paper/sheets	\$190/100	\$250/100	\$400/200	\$170/100
Cost of transparencies/sheets	\$190/100	\$350/100	\$550/100	NA
Cost of ribbon/sheets/type	\$175/100/3-color,† \$280/80/4-color	incl. in media price	\$700/400/3-color, \$900/400/4-color	\$816/160/4-color
Other				
Dimensions (L x W x H)	17.5 x 16.2 x 12.2 in.	19.4 x 16.75 x 7 in.	17.4 x 17.2 x 14.7 in.	22.4 x 20.5 x 13.4 in.
Weight	62 lb	44 lb	73 lb	84 lb
Warranty	1 year	90 days (labor), 1 year (parts)	1 year	90 days (parts and labor)
Extended warranty (cost/year)	\$3,500	various options	\$950	\$1,960
Company	Mitsubishi Int'l. Corp. 701 Westchester Ave. White Plains, NY 10604 914-997-4999 914-997-4976 (fax)	Sony, Inc. 3 Paragon Dr. Montvale, NJ 07645 800-472-7669 201-930-1000 201-358-4274 (fax)	Tektronix, Inc. 26600 S.W. Pkwy. Wilsonville, OR 97070 800-835-6100 503-682-7377 503-685-3063 (fax)	3M Imaging Systems Group 3M Center Bldg., 223-2N-01 St. Paul, MN 55144 800-362-3456 612-731-6501 612-736-5613 (fax)

†Three-color overhead-transparency ribbons cost \$330 for 100 prints.

Desalination Test Results

Effective November 12, 1992

Over the past 40 years Delta, Inc. has been conducting tests on the effectiveness of US and Worldwide-based desalination plants. The results are surprising and the following table shows the volume (in parts per million) of residual compound A and compound B (see appendix IV-X) after processing.

Samples have been aggregated and averaged from 27 runs distributed evenly between LSA, the Middle East, and Guam.

Sample date	Compound A (ppm)	Compound B (ppm)
0 to 5 years	30	35
5 to 10 years	15	15
10 to 15 years	27	33
15 to 20 years	40	29
20 to 25 years	39	31
25 to 30 years	15	35
30 to 35 years	23	42
35 to 40 years	23	43

While these results are far from alarming they indicate the cyclic oscillations of the compound A and compound B residues. The levels are in fact well within the FDA guidelines for any possible water use but we would like to see these levels halved. Computer analysis shows that the compound A and compound B levels are intimately connected and the cycle period appears to be approximately 30 years.

I would like to point out that this coincides precisely with increased sun spot activity. We believe that the DMI reduction in the extreme high bandwidth is the factor most likely to be causing this phenomenon.

Delta, Inc. will continue its diligent testing over the next 30 years after which time a further 4 years will be required for processing and analyzing the collected data. Meanwhile, we would like to assure all our customers that there is absolutely nothing to fear from drinking water processed by our desalination systems.

Sincerely,

H. T. Rao
President and CEO
Delta, Inc.

MEMO

DATE: November 12, 1992

TO: ALL MANAGERS

FM: TED SCRAM

RE: EARTHQUAKE AWARENESS

For your convenience the Geological Resource Center has compiled detailed geological data for your geographic area. The results tend to indicate that there is an increased likelihood of earthquake activity in your immediate vicinity. Please review the data below. I think you will notice that there is a definite trend.

SE Offset	010	020	030	040	050	060	070	080	090
12	12	13	14	15	16	17	18	19	20
13	13	14	15	16	17	18	19	20	21
14	14	15	16	17	18	19	20	21	22
15	15	16	17	18	19	20	21	22	23
16	16	17	18	19	20	21	22	23	24
17	17	18	19	20	21	22	23	24	25
18	18	19	20	21	22	23	24	25	26
19	19	20	21	22	23	24	25	26	27
20	20	21	22	23	24	25	26	27	28
21	21	22	23	24	25	26	27	28	29
22	22	23	24	25	26	27	28	29	30
23	23	24	25	26	27	28	29	30	31
24	24	25	26	27	28	29	30	31	32
25	25	26	27	28	29	30	31	32	33
26	26	27	28	29	30	31	32	33	34
27	27	28	29	30	31	32	33	34	35
28	28	29	30	31	32	33	34	35	36
29	29	30	31	32	33	34	35	36	37
30	30	31	32	33	34	35	36	37	38
31	31	32	33	34	35	36	37	38	39
32	32	33	34	35	36	37	38	39	40
33	33	34	35	36	37	38	39	40	41
34	34	35	36	37	38	39	40	41	42
35	35	36	37	38	39	40	41	42	43
36	36	37	38	39	40	41	42	43	44
37	37	38	39	40	41	42	43	44	45
38	38	39	40	41	42	43	44	45	46
39	39	40	41	42	43	44	45	46	47
40	40	41	42	43	44	45	46	47	48
41	41	42	43	44	45	46	47	48	49
42	42	43	44	45	46	47	48	49	50
43	43	44	45	46	47	48	49	50	51
44	44	45	46	47	48	49	50	51	52
45	45	46	47	48	49	50	51	52	53
46	46	47	48	49	50	51	52	53	54
47	47	48	49	50	51	52	53	54	55
48	48	49	50	51	52	53	54	55	56
49	49	50	51	52	53	54	55	56	57
50	50	51	52	53	54	55	56	57	58
51	51	52	53	54	55	56	57	58	59
52	52	53	54	55	56	57	58	59	60
53	53	54	55	56	57	58	59	60	61
54	54	55	56	57	58	59	60	61	62
55	55	56	57	58	59	60	61	62	63
56	56	57	58	59	60	61	62	63	64
57	57	58	59	60	61	62	63	64	65
58	58	59	60	61	62	63	64	65	66
59	59	60	61	62	63	64	65	66	67
60	60	61	62	63	64	65	66	67	68
61	61	62	63	64	65	66	67	68	69
62	62	63	64	65	66	67	68	69	70
63	63	64	65	66	67	68	69	70	71
64	64	65	66	67	68	69	70	71	72
65	65	66	67	68	69	70	71	72	73
66	66	67	68	69	70	71	72	73	74
67	67	68	69	70	71	72	73	74	75
68	68	69	70	71	72	73	74	75	76
69	69	70	71	72	73	74	75	76	77
70	70	71	72	73	74	75	76	77	78
71	71	72	73	74	75	76	77	78	79
72	72	73	74	75	76	77	78	79	80
73	73	74	75	76	77	78	79	80	81
74	74	75	76	77	78	79	80	81	82
75	75	76	77	78	79	80	81	82	83
76	76	77	78	79	80	81	82	83	84
77	77	78	79	80	81	82	83	84	85
78	78	79	80	81	82	83	84	85	86
79	79	80	81	82	83	84	85	86	87
80	80	81	82	83	84	85	86	87	88
81	81	82	83	84	85	86	87	88	89
82	82	83	84	85	86	87	88	89	90
83	83	84	85	86	87	88	89	90	91
84	84	85	86	87	88	89	90	91	92
85	85	86	87	88	89	90	91	92	93
86	86	87	88	89	90	91	92	93	94
87	87	88	89	90	91	92	93	94	95
88	88	89	90	91	92	93	94	95	96
89	89	90	91	92	93	94	95	96	97
90	90	91	92	93	94	95	96	97	98
91	91	92	93	94	95	96	97	98	99
92	92	93	94	95	96	97	98	99	100

This data may be a little complex and difficult to follow but feel free to call me during office hours and I'll be happy to spend as much time as needed to explain the relevance of the above table.

REMINDER

All surveys after November 1992 are chargeable at the full rate as detailed in the recent price adjustment sheet sent to all customers.

Coastal Region Report

The Operating Committee at its annual meeting held in Hawaii in October 1992 reviewed a recent report from the Salinas Corporation. This report contrasted the cost of "conventional water" with desalinated water. The cost of producing desalinated water is on the whole no lower than the cost of processing water conventionally. There are some areas however where we noted some cost differences. The differences are most notable in the areas of labor and energy. Labor costs for desalinating are just 50% of conventional and energy costs are some 30% lower.

At the other end of the scale, materials costs are almost 20% higher than conventional. Land costs are lower, probably because coastal land is cheaper and less land is required. Over the next seven months we will be deciding exactly what the company future policy will be regarding development of water systems for the city.

In case any of this is unclear let me restate it:

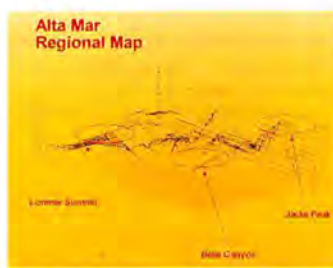
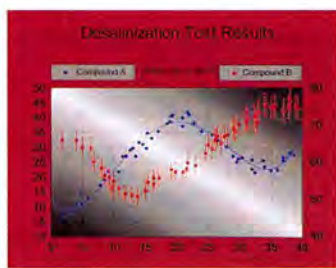
1. The cost of producing desalinated water is on the whole no lower than the cost of processing water conventionally.
2. There are some areas of cost difference, the differences are most notable in the areas of labor and energy.
3. Labor costs for desalinating are just 50% of conventional and energy costs are some 30% lower.
4. Materials costs for desalinating are almost 20% higher than conventional production.

It is the responsibility and public duty of the Operating Committee to conclude it's surveys within the next four months and make recommendations to the Operating Sub-Committee. The Operating Sub-Committee will then prepare full budget plans for submission to the city council for posting at a subsequent City meeting.

BLAH.

BLAH.

BLAH.



OH.

OH!

OH MY!

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MacUser MacWEEK

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Quick clips: Dover Publications, already synonymous with high-quality hard-copy clip art, has teamed with Bantam Computer Books to produce The Dover Electronic Clip Art Library. The \$49.95 package includes a book that

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quality clip art with an environmental theme? Check out Arro International's Arroglyphs Environment 1 Collection of 200 black-and-white EPS graphics, many with the look of **bold woodcuts**. And Arro practices what it preaches too: All packaging material is made from

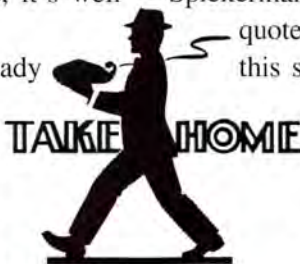
recycled paper. 201-746-9620. \$199.95 (a ten-image sampler disk is \$10).

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quotes from the likes of **Tallulah Bankhead**, this spirited guide to typography will help novice as well as expert type users decipher unfamiliar terminology and rules. (The title refers to a quote by type designer Frederic Goudy.) 415-961-4400. \$24.95.



By Pamela Pfiffner

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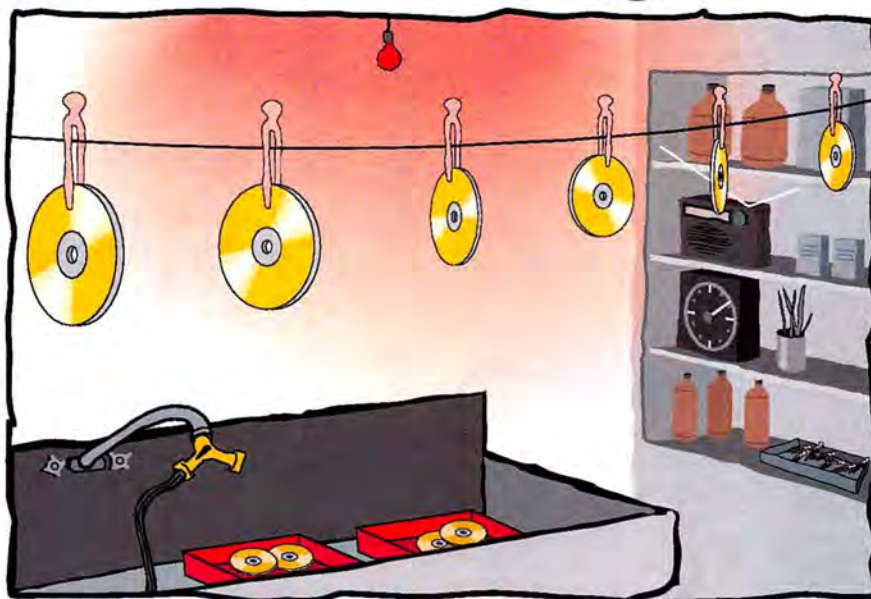
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Photo CD: The Big Picture



*What's all this talk about Kodak's Photo CD?
Get beyond the hype, and read what this new digital-imaging
technology could mean for you.*

By Connie Guglielmo

Since introducing its digital-photography-storage and -manipulation technology in September 1990, Eastman Kodak has spent considerable amounts of time and money bringing the concept of Photo CD into focus. But whether Photo CD becomes a commercial success and an industry standard for handling digital images is still very much up to users. Despite the print and broadcast ads, strategic alliances with companies such as Apple, new Photo CD-compatible software and hardware, and promising digital-photography-publishing applications, Photo CD systems have been in use for less than a year. And many of the Photo CD components needed to deliver higher-quality images to professional publishers and to make use of digital photography are just now reaching the market.

Yet providing support for Photo CD has become a checklist item for many application developers, in much the same way that QuickTime has. For those who've been wondering what all the hoopla's about, here's a look at Photo CD: how it works now and what to expect in the future.

Photo CD 101

With Photo CD, Kodak found a way to drive photography into the digital world without having to develop new camera equipment and film. Kodak combined preexisting and new technology into a system that lets photo finishers store processed film in digital form on low-cost CD-ROMs.

In June 1992, Kodak released the Photo CD Imaging Workstation (PIW) 2400, an \$80,000-to-\$100,000 proprietary hardware and software system for photo finishers — people in the business of developing film. After your roll of film has been developed and produced the old-fashioned way, the photo finisher uses the PIW system to take your images through a four-step process (see Figure 1):

1. A Kodak PCD Film Scanner digitizes 35mm negatives or mounted 35mm slides.

2. A Sun Microsystems SPARC-based workstation, called the Kodak PCD Data Manager S200, automatically makes color corrections and then saves the digitized image in Kodak's proprietary Photo CD file format, called the Photo CD Master format. Each image is stored at five resolutions to accommodate a range of print and display options.

3. A Kodak PCD Writer records the converted and compressed image data onto a Photo CD disc.

4. A Kodak PCD Printer produces near-photographic-quality prints, which can include standard-sized prints, enlargements as big as 10 x 10 inches, and what Kodak calls an index print — a sheet bundled with the Photo CD disc that features thumbnail versions of every image.

The PIW 2400 system also includes a CD-ROM XA drive, which photo finishers use to read Photo CD images from already-pressed discs when a customer returns to have additional prints made. (The images are routed back through the

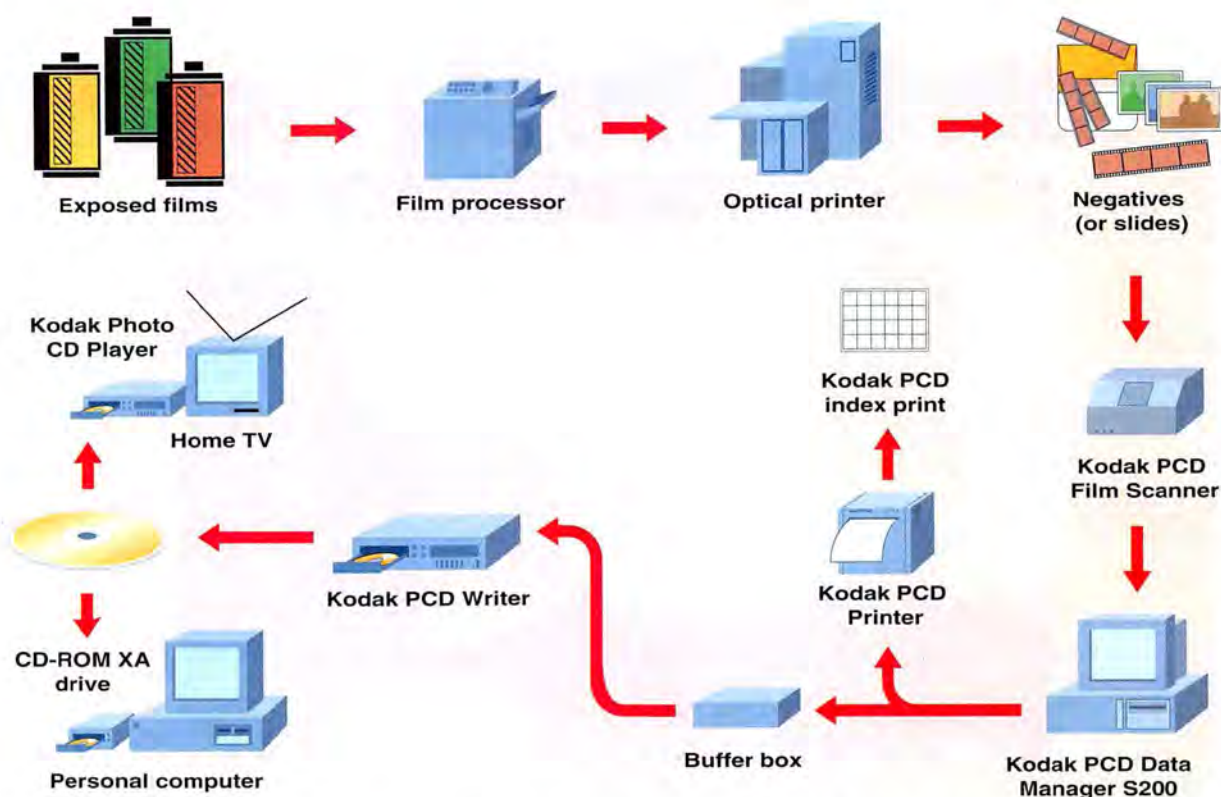


Figure 1: The path from film to Photo CD involves four main steps. After regular film processing, when slides or negatives and prints have been made, a Kodak PCD Film Scanner digitizes negatives and the digital images are transferred to a Kodak PCD Data Manager S200 for automatic color correction. The image is saved in the Photo CD format at five

resolutions. A Kodak PCD Writer records the converted and compressed image data onto a Photo CD disc. Kodak's PCD Printer produces near-photographic-quality prints, including an index print that shows thumbnail versions of every image. Then the disc can be viewed on a TV with a consumer Photo CD player or on a computer monitor with a CD-ROM XA drive.

PCD Data Manager to the PCD Printer.) The Photo CD format is based on the CD-ROM XA data format, the extended architecture developed by Philips and Sony that adds interleaved audio to the basic CD-ROM format. Interleaved audio is compressed sound that can be played before, while, and after an image on the CD-ROM is displayed.

For a Photo CD disc containing all the images from one roll of 24-exposure negative or slide film, you pay about \$20, which includes film processing. A Photo CD disc can hold about 100 images, each stored at five resolutions, or about four rolls of 24-exposure film. Photo finishers charge about \$1 per slide to digitize already-mounted 35mm slides.

To save users from having to "waste" any part of a Photo CD disc just because they don't have enough images to fill the disc at one time, Kodak came up with a new approach to writing images to Photo CD discs: multisession technology. This technology enables you to add, or write,

data — images, sound, text, and graphics — to a Photo CD disc in several batches. (In contrast, other mastering systems write data only once to the disc, which can hold 600 megabytes of data. Any space left unused on the disc at recording time is effectively lost.) Multisession drives aren't required in order to use Photo CD (XA compatibility is), but having a multisession drive means that you have the freedom to process only one roll of film or a few images at a time and then add images to the same Photo CD disc later. Part of the industry's CD-ROM Mode 2 data-storage standard, multisession technology is coming to market in several devices (see the "Photo CD Drives and Players" sidebar).

Split Audience

Kodak divides the target audience for Photo CD into two groups: consumers and computer users. Consumers are people interested in putting their personal photographs and old 35mm slides

on-disc to create digital slide shows and photo albums that they will display on their TV sets. For consumers, the four-step process outlined above pretty much tells the Photo CD story. All you have to do is pick up your Photo CD disc, drop it into a Photo CD player attached to your TV set, and press the Play button.

But the TV-based players for the consumer market don't meet the needs of the computer-user group, mainly because they were designed without a computer interface. Instead, using a multisession CD-ROM XA drive is the way to put Photo CD images into play for business presentations, multimedia publishing, image databases, and digital catalogs. For desktop-publishing and prepress applications, Kodak is promoting Photo CD technology as a way to create digital negatives from which an endless number of high-quality prints can be repeatedly generated without any loss of quality. If you're accustomed to working with high-resolution images on a Mac, delving more

Figure 2: To judge the image quality achievable with Photo CD, we asked ZZYX Visual Systems, of Los Angeles, California, to scan a slide to a Photo CD disc in two ways: first, by using automatic color and exposure controls; second, by using manual overrides to color-correct the image. Compare these two scans (center) with scans generated by a desktop flatbed scanner at 300 pixels per inch (top) and a high-end drum scanner at 133 lines per inch (bottom).

deeply into the process behind creating a Photo CD disc provides a better understanding of the benefits and trade-offs of the technology.

Beyond the Basics

Kodak's PCD Film Scanner (based on CCD [charge-coupled device] technology) takes about five seconds to digitize an image at a resolution of 2,048 x 3,072 pixels, generating an 18-megabyte RGB (red, green, blue) data file. The scanner works with the PCD Data Manager workstation to automatically adjust the color and density of each image according to the make and type of film it's scanning. Kodak has analyzed the characteristics of more than 200 films — from manufacturers such as Agfa, Fuji, Konica, Polaroid, and 3M — and constantly updates and adds new film definitions. To get the best possible automatic scans and color adjustments the system can offer, all a PIW operator has to do is tell the scanner which make and type of film is being scanned.

Sometimes what was designed to correct for bad photography actually changes good photography, however, and some professional photographers have been unhappy with the system's automatic color-correction features, which can wipe out desired photographic effects achieved with camera filters and special lighting. Fortunately, photo finishers can manually override the system. In addition, many professional photographers use older types of film that are not supported by the PIW, so Kodak developed a neutral setting for a "universal" film type that makes no assumptions about the characteristics of the film being scanned. PIW operators can select the universal film type without knowing what make or type of film they're scanning, which is often the case with mounted 35mm slides.

By going to a Photo CD-equipped professional photo lab instead of to a high-



Image scanned with a desktop flatbed scanner at 300 pixels per inch



Image scanned to a Photo CD disc at 1,024 x 1,536 pixels, with automatic color adjustments



Image scanned to a Photo CD disc at 1,024 x 1,536 pixels, with manual color adjustments



Image scanned with a high-end drum scanner at 133 lines per inch



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volume photo finisher, you may be less likely to encounter color-correction problems. You'll pay a higher scan price, but even at about \$3 per scan (instead of the usual \$1), ZZYX Visual Systems in Los Angeles, for example, still charges less than the \$15 or more that you would pay per scan for CCD scans of comparable quality. A custom photo lab does not rely on the system's automatic color corrections and takes the time to make sure the appropriate film type and make or the universal film type is selected at scan time.

Storage Trade-offs

Other image-quality trade-offs stem from Kodak's proprietary Photo CD format. To make room for the maximum number of images it could fit on a disc (at 18 megabytes per image, only about 30 would otherwise fit on a Photo CD disc), Kodak developed the PhotoYCC data format, which encompasses a unique way of defining color as well as a new compression technology. PhotoYCC's color space is based on video standards,

including the current U.S. NTSC standard and the proposed high-definition-TV (HDTV) standard.

The PCD Data Manager converts an 18-megabyte RGB image into PhotoYCC format, which divides the image into two parts chrominance (color) and one part luminance (light and dark) values. As part of its compression scheme, the system subsamples the chrominance information, on the assumption that the eye is more sensitive to changes in luminance. The 18-megabyte data image ends up as a 4.5-megabyte file called an *image pac*, which includes five versions of the image at various resolutions. The PCD Data Manager then uses the Kodak PCD Writer to write each image pac onto a Photo CD disc.

The resolutions stored in the image pac include a thumbnail version (also called Base/16), which is 128 x 192 pixels; Base/4, which is 256 x 384 pixels; and Base resolution, which produces a 512-x-768-pixel image that is the closest to TV resolution and also the closest to the Mac's standard 640-x-480-pixel

Photo CD Drives and Players

To display Photo CD images, players must be able to read Kodak's proprietary data formats for Photo CD images, which are all based on the PhotoYCC color space. The available Photo CD players fall into three categories: consumer, multisession Photo CD/audio-CD drives developed by Philips and distributed by Kodak, which all use TVs for display; single-session CD-ROM XA drives that support the Photo CD format but can read images only from the first session recorded; and multisession CD-ROM XA drives.

Kodak offers three consumer players that each sell for a few hundred dollars more than a standard audio-CD drive. The PCD 270 (\$379) is Kodak's entry-level player. It holds a single Photo CD or audio CD and offers a limited set of on-screen photo-manipulation features, such as pan and zoom, which you access with a special remote control. Described as "fully featured" players, Kodak's PCD 870 (\$449), a single-disc player, and PCD 5870 (\$549), which can hold five discs, provide more display and editing functions. In addition to image pan and rotate, they have a crop-and-enlarge feature, called 2X tele, that lets you select a rectangular portion of an image and enlarge it. The players also have an insert feature, which lets you view images in any order. Philips Compact Disc Interactive (CDI) players, which sell for about \$700 apiece, are also Photo CD-compatible.

Single-session drives that can read and display Photo CD images on the Mac include the AppleCD 150 and the NEC CDR-74.

In the multisession arena, Sony and Toshiba America have developed mechanisms that are being repackaged and marketed as part of systems sold by Apple, MicroNet Technology, and SuperMac Technology. Sony plans to begin selling a drive based on its multisession mechanism directly to consumers in mid-1993. Apple uses the Sony mechanism for its AppleCD 300 (\$599), which is also built in to the Mac IIvx and Performa 600 CD, and MicroNet Technology uses the Sony mechanism for its Micro/CD-ROM drive (\$995). Toshiba offers an external double-speed multisession drive, the TXM-3401. With a Mac adapter kit including software and SCSI cable, it costs about \$1,000. SuperMac has chosen the Toshiba drive for its PhotoSpeed systems, \$4,000-to-\$5,000 product bundles that include the drive; a 24-bit video-display and -acceleration board; and image-access, -manipulation, -retrieval, and -compression software.

resolution. There are two higher resolutions as well: 4Base, at 1,024 x 1,536-pixels, is the equivalent of the proposed HDTV standard, and 16Base, at 2,048 x 3,072 pixels, is designed to replicate the original scan. The highest-resolution image is roughly equivalent to an 8-x-10-inch image at 133 lines per inch.

Only the thumbnail, Base/4, and Base resolutions are stored uncompressed. To create 4Base and 16Base images, the Photo CD system adds pixel information to the Base image, interpolating to achieve the higher resolutions. Some color publishers may discover, however, that the higher resolutions don't meet their needs for high-end color print work. Even though Kodak's compression scheme is supposed to be lossless, compromises are made when chrominance and luminance information is lost during compression, and these compromises become most evident in the printing of high-resolution images.

On the other hand, some prepress pioneers who have been conducting early tests with Photo CD report that they've been pleasantly surprised by the results. Given careful scanning and color adjustments, Photo CD images can achieve a quality comparable to that obtained from a drum scanner (see Figure 2).

Future Formats

To further distinguish between consumer and computer applications for Photo CD, Kodak is readying several new file formats. Starting this summer, in addition to requesting the current Photo CD Master format (100 images at five resolutions), you'll be able to ask your photo finisher for Photo CD Portfolio discs. The Portfolio format stores only one version of each image, at the Base resolution. Instead of 100 images, the Portfolio format can accommodate 800 images, one hour of audio-CD-quality stereo sound, or any combination of images and sound. There is one catch: Portfolio discs cannot be created directly from film negatives and slides. Instead, existing Photo CD images are copied from Master-format discs and reformatted as Portfolio images. The advantage of the Portfolio approach is that you can edit

out any dark or out-of-focus images and select only the images you actually want to include on the disc.

To respond to the needs of users in business, multimedia, and publishing, Kodak has developed three additional formats that will be available at about

the time you read this. Geared toward multimedia, the Photo CD Catalog format can store 6,000 images at a low resolution that's good enough for video display but not good enough for photo-quality prints. The Photo CD Medical format is designed specifically to accommodate medical pho-

tographs and radiographs.

If you're serious about photo quality, however, you'll be interested in the Pro Photo CD format, which can be generated by a new Kodak PIW system, the Professional PIW 4200. Slated to sell for about \$120,000 starting in May or June, the Pro PIW 4200 includes a new Professional 4045 film scanner, which offers 24-bit-color scanning in resolutions as high as 4,000 x 6,000 pixels, comparable in quality to that offered by drum scanners but for considerably less than the \$25 to \$75 per scan charged for that service.

In addition to 35mm film, the new scanner accommodates the larger film sizes (120-roll and 4-x-5-sheet) that most professional photographers use. Images scanned on the Pro system will be stored in the new Pro Photo CD format, which lets users add a copyright identifier to images as well as place a watermark over images to prevent unauthorized use. The Pro Photo CD format also supports an encryption feature.

To find out which photo finishers are equipped with the PIW 2400 or Pro PIW 4200 system, call Kodak's Photo CD hot line (800-242-2424, extension 36).

Kodak's Software Suite

Once you've imported Photo CD images into your Mac, you can modify and incorporate them as you can any other scanned photo. Not surprisingly, Kodak has created a suite of software products for displaying, editing, and manipulating Photo CD images on the Mac:

- Photo CD Access (\$39.95) lets you

**Prepress pioneers
who have been
conducting early tests
with Photo CD report
that they've been
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DESKTOP PUBLISHING TECHNOLOGY

At a Photo CD Player Near You

Applications for Photo CD go beyond digital photo albums. Two Photo CD projects created in the past year show how the technology can be put to use for interactive presentations.

Publishing

In the fall of 1992, the first book to be bundled with a Photo CD disc came to market, from Addison-Wesley Publishing. Through photographs, *From Alice to Ocean* chronicles the tale of a 27-year-old Australian woman, Robyn Davidson, who trekked 1,700 miles across the outback in 1977, accompanied by four camels; a dog; and for the most part, a photographer. The color coffee-table book was



assembled by photographer Rick Smolan, creator of the *Day in the Life* series of photography books. On assignment for *National Geographic*, Smolan shot some 500 rolls of film during Davidson's adventure. Only about 30 photos actually made it into the magazine story.

Published as a book with an accompanying Photo CD disc, *From Alice to Ocean* tells the story of Robyn Davidson's trek across the Australian outback. One hundred previously unpublished photos are stored on the disc.

For the book, Smolan combined 200 photographs with text excerpts from Davidson's book about her journey, called *Tracks*. For the Photo CD disc, which he developed with Kodak, Smolan used another 100 previously unpublished images as well as excerpts from an audiocassette reading of *Tracks*. With a consumer Photo CD player, you can play through the entire disc from beginning to end, which takes about 30 minutes. With a CD-ROM XA drive, you

can view the photos on-disc individually but without sound. In addition, the book is bundled with a regular CD-ROM (Photo CD compatibility is not required) containing an interactive QuickTime-movie presentation of the *From Alice to Ocean* material, which Smolan created with Apple.

Interactive Exhibit

In mid-1992, a Photo CD-based kiosk was added to the Smithsonian Institution's Museum of American History. The kiosk is part of the Information Age exhibit, which charts society's technological achievements from the telegraph to today's personal computers. The interactive display not only gives museum-goers a chance to play with Kodak's technology hands-on but it also allows the museum to record events in a more dynamic way. For example, each year the museum sponsors a popular Folklife festival, inviting people from all over the country to display their crafts, sing and dance, and tell stories about life in their communities. In the past, photographs of the festival were put on display at the museum.

As an experiment, exhibit curator David Allison and his colleagues created a Photo CD disc with Kodak and used the as-yet-unreleased Portfolio format to create a disc with 46 photographs of New Mexico's presentation. The disc, which is divided into six tracks, mixes photographs taken during the festival with voice-over narration and music. "The Photo CD seemed to us a relatively easy and low-cost way to capture the flavor of the festival," Allison said, adding that the test has proved so successful that the Smithsonian is considering turning it into a commercial product and is reviewing ways to use Photo CD in other exhibits.



The Smithsonian Institution used Photo CD to create an interactive exhibit showcasing highlights from its annual Folklife festival. The disc contains 46 images of the contingent from New Mexico.

display Photo CD images and perform basic editing functions such as crop, zoom, and rotate. It converts images from Photo CD format into PICT, TIFF, and EPS files, so you can use them in other Mac applications.

- PhotoEdge (\$139) lets you adjust the contrast, color, focus, and sharpness of Photo CD images.

- Two image-retrieval applications are available: Browser is a basic image-database and -retrieval program that searches for images by keyword and is available only with Photo CD Catalog discs. Shoebox (\$349) lets you create and access large image databases that are stored on multiple discs.

- Renaissance, a \$695 page-layout program, can incorporate Photo CD images directly from disc — a feature Kodak has recently begun touting. This means that the program automatically does the conversion from Photo CD format to Mac formats as it reads images from a disc.

More significant, this year Kodak will release desktop authoring software that will let users not only read but also write Photo CD images. Currently Macintosh applications can read the Photo CD format, but then they convert the image to TIFF and PICT. Kodak's authoring software will let you save images in the Photo CD format, thus taking advantage of Kodak's innovative PhotoYCC compression scheme, a technology that may prove to be better than JPEG compression. The software will let you convert all your TIFF and PICT files into Photo CD format, and with Kodak's PCD Writer 200 (\$5,995) and recording software (\$2,495), you'll be able to create your own Photo CD disc (writable discs will cost \$25 apiece).

Software Support

Because so far Kodak has kept the Photo CD file format proprietary, developers who want to support Photo CD images within their applications must license the technology royalty-free from Kodak. The Photo CD Developer Toolkit sells for \$695 and can be embedded within Mac applications to handle reading and displaying Photo CD images (actually converting the PhotoYCC data for

display on the Mac's RGB screen) and then writing the images in Mac file formats. Mac developers, including Aldus and Adobe Systems, have announced that they will incorporate Photo CD support within applications such as PageMaker and Photoshop.

Kodak's most prominent supporter in the Mac arena is Apple, which supports the Photo CD format through its Quick-

Time 1.5 multimedia extension to System 7. Like Photo CD Access, QuickTime opens Photo CD images and converts them into PICT format so you can manipulate them on the Macintosh. Apple's support for Photo CD also includes its release of a multi-session CD-ROM drive, which the company is selling as a stand-alone

peripheral for the Mac and also built in to the Performa 600 CD and the IIfx.

Not There Yet

Kodak has bet the farm on Photo CD, but for all its potential, it still has kinks to be worked out. For example, to get the full benefit of a Photo CD presentation with sound and segues, such as the book/Photo CD set *From Alice to Ocean* (see the "At a Photo CD Player Near You" sidebar), you have to view it on a consumer player. When you view it on your Mac with a CD-ROM XA drive, all you get are still photos. Interactive Photo CD-based movies on the Mac have to be executed with QuickTime.

For professional imaging, the implications are more far-reaching: If consistently high-quality scanning can be achieved with Photo CD technology, high-end drum scanners may become a thing of the past. The impact on the low-end to midrange scanner market may be even more devastating. Why buy a scanner if you can get your photos scanned for \$1 to \$6 per scan? One thing is certain: If Kodak can continue to keep its high level of commitment to the marketplace and to make changes that accommodate consumer demands, the company may once again change the way people collect, view, and use photographs. ☐

Free-lance writer and former *MacWEEK* editor Connie Guglielmo now knows Kodak's phone numbers by heart.

For professional imaging, the implications are far-reaching: High-end drum scanners may become a thing of the past.

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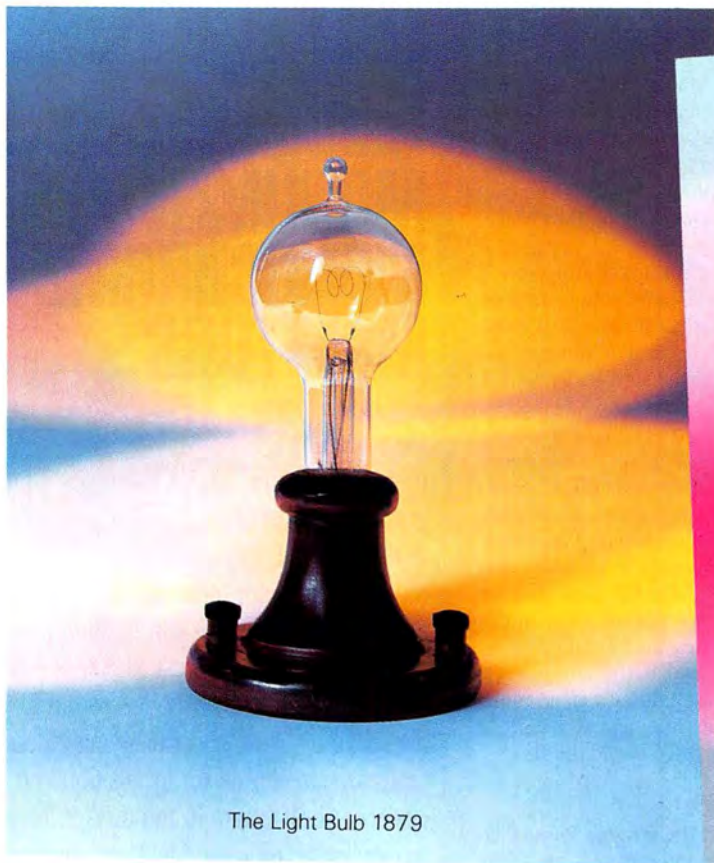
The Labs experts are screening 23 monochrome and gray-scale monitors in this in-depth Labs report — for color temperature, color analyzer, the notorious pin cushion test, and more. All models cost \$1,500 or less, ranging from low-cost models to big 21" two-page displays; accompanying video cards are also tested for installation and ease of use. If you're in the market for a monochrome monitor, MacUser's got the answers in black and white.



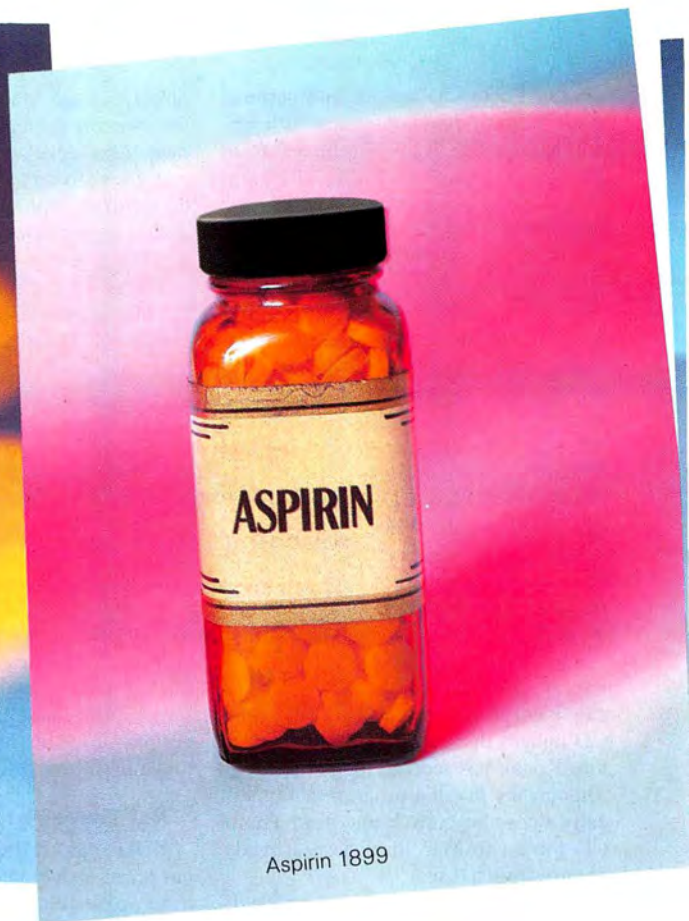
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Shining Through

Illustrator Jeff McCord uses Photoshop to let the background shine through transparent sunglass lenses.

By Janet Ashford

One of the most powerful features offered by painting and image-editing programs such as Adobe Photoshop, Fractal Design's ColorStudio, and SuperMac's PixelPaint Professional is the ability to control the opacity of objects so that the background shows through when they're pasted into an image. Jeff McCord, of Free-Lancelot, in Seattle, recently took advantage of that feature to complete a challenging assignment for the Seattle ad agency Matthaeus, Donahoe, Halverson. The agency asked McCord to photo-edit images for a product catalog for a client, Industrial Strength Eyewear (ISE), a producer of modular sunglasses.

The design goal was to combine product shots of the sunglasses with photographs of various industrial backgrounds.

Art director Paul Matthaeus wanted to control the color of the glasses and the backgrounds independently, but he also wanted the combined photos to appear as unified images. McCord used Photoshop's color-correction functions to achieve a dark, richly colored look for the industrial shots and then used selection tools and paste controls to merge the sunglasses and the backgrounds. By controlling the opacity of selected areas, he achieved the effect of transparent sunglass lenses.

Seattle photographer Tom Collicott took the original photos, and Dave Patterson, of WIZYWIG, a Seattle service bureau, scanned them at 300 dpi on a Scitex Smart Scanner.

Janet Ashford is coauthor of *The Verbum Book of PostScript Illustration*.



Illustrator Jeff McCord creates images for Industrial Strength Eyewear's color catalog and ads by using Adobe Photoshop to combine product shots with industrial backgrounds. To make the sunglass lenses appear transparent, McCord uses Photoshop's Paste Controls dialog box, on the Edit menu, to set the opacity of selected portions of the images.



1 Editing the Background

Industrial-background shots such as this diesel-engine control panel are scanned on a Scitex Smart Scanner, after which McCord opens them in Photoshop for editing (left). He uses Photoshop's Arbitrary Map dialog box (on the Image menu) to manipulate the photo's color curve, adding green, darkening, and slightly solarizing the photo. He then uses the magic-wand tool and the Similar command (on the Select menu) to isolate the bright dial faces. He feathers the selection so the changes blend into the rest of the image and then uses the Hue/Saturation controls to make a "Hulk-green" tone (right).



2 Silhouetting the Sunglasses

Photographs of different-colored sunglasses, shot on glass against neutral backdrops illuminated by overhead and soft-fill lights, are scanned at 300 dpi with the Scitex Smart Scanner. For the time-consuming task of silhouetting the sunglasses, McCord brings in prepress consultant Doug Peltonen, who uses Photoshop's magic-wand and other selection tools to delete the background grays.



3 Pasting the Sunglasses

McCord opens the yellow-sunglasses file in Photoshop and clicks on its white backdrop with the program's magic-wand tool. To avoid selecting fuzzy edges, he chooses zero tolerance and no anti-aliasing. Using Inverse, from the Select menu, he selects everything except the background (the sunglasses, in this case). He copies the sunglasses selection to the Clipboard and then pastes it into the background image.



4 Making the Glasses Transparent

With the pasted sunglasses still active, McCord chooses Paste Controls from the Edit menu and enters 60-percent in the Opacity field. This allows 40-percent of the background to show through both the lenses and the frames.



5 Making the Frames Opaque

To restore the frames to 100-percent opacity while keeping the lenses at 60-percent opacity, McCord pastes a copy of the original glasses file into the background. He positions the opaque copy over the transparent pair and uses the lasso tool to draw around the newly pasted opaque lenses. Holding down the Command key while he draws subtracts the selected lenses from the glasses until only the solid frames are highlighted.



6 Restoring the Highlights

To exaggerate the highlights on the lenses, McCord pastes the original glasses file into the background image for a third time and positions it as before. Then, with the glasses file still selected, he specifies Lighten Only in the Paste Controls dialog box. This technique pastes only those parts of the opaque glasses that are lighter than the underlying image. With these lighter areas still selected, McCord uses Photoshop's Brightness/Contrast controls to increase the contrast until he achieves the desired white specular reflection on the left lens.



7 Finishing the Illustrations

Throughout the ISE catalog, McCord uses the same techniques. For this page, McCord pastes clear lenses onto a blue background. He adds soft drop shadows behind the glasses by creating a mask layer and then using Photoshop's Calculate functions (on the Image menu) to subtract a fuzzy mask from the black plate. The glasses "float" just above the background.

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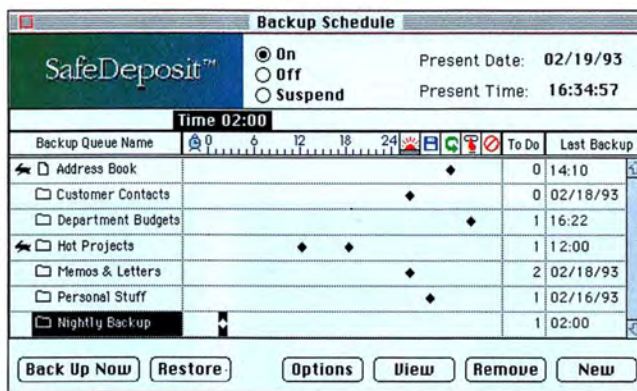
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More Ethernets, fewer boxes: Gone are the days when routers had just one Ethernet and one LocalTalk port: Compatible Systems' RISC•Router 3000E has *two* of each, in one 19-inch rack-mountable slab. This router talks the talk (AppleTalk, TCP/IP, DECnet, SNMP, and so on) and walks the walk with **RISC-powered pizzazz**. Its R3000 RISC CPU is the same as that found in Silicon Graphics' Indigo workstation, and it has



flash ROM for easy firmware upgrading. The cost? A mere \$2,995. 800-356-0283 or 303-444-9532.

◆ For those more partial to Cayman beige than Compatible's basic black, Cayman offers a 19-inch rack-mountable router with two Ethernet — but no LocalTalk — ports. The GatorBox EX is faster than previous GatorBoxes (it runs on a 40-MHz 68030 rather than on a 10-MHz 68000), has flash ROM, and performs all the standard AppleTalk- and TCP/IP-related routing tasks. It also runs Cayman's GatorShare EX AFP-to-NFS gateway. The GatorBox EX costs \$3,495; GatorShare EX is an additional \$995. 617-494-1999.

Watching your net work:

Network-monitoring packages aren't anything new these days. Choosy buyers want packages that support lots of devices and protocols, and Caravelle Networks' NetWORKS 3.0 does just that: The new version supports AppleTalk, TCP/IP, IPX, and DECnet monitoring, and it lets you keep track of devices that speak SNMP — both the AppleTalk and the TCP/IP dialects. If NetWORKS finds something amiss, it can **zap you a pager alert** or an E-mail message. \$295 for the junior

version (for as many as 20 devices); \$995 for the unlimited version. 800-363-5292 or 613-596-2802.

Quicker mail? While Apple labors to complete its AOCE (Apple Open Collaboration Environment) mail system before its acronym grows any longer, CE Software has gone ahead and released QuickMail 2.6. The server now supports remote administration and more simultaneous users, plus it lets you **juggle users among servers**.

The client side now provides an Undo function in the message editor (about time!). \$649 for a 10-user pack, \$40 to upgrade all users from 2.5.x versions, or \$12 per user to upgrade from earlier versions. 515-224-1995.

Alternative mailboxes: Sometimes the people you want to send E-mail aren't that easy to reach, but hey, there's always fax. CommFORCE's 4-Sight Fax fax-server software uses either Microsoft Mail or QuickMail as the underlying transport mechanism to let folks on a network send and receive faxes. The 4-Sight Fax program can support as many as eight simultaneous lines; pricing

starts at \$3,995 for a single-phone-line version. 515-224-0211. ◆ If faxing doesn't work, try sending a page. Wolf Creek Group's QuickMail gateway for alphanumeric pagers, QM-

Page, is designed for large organizations with many pagers, and its \$1,995 price tag (for a 20-user license) reflects this. To **hunt someone down via pager**, you just fill out a special QuickMail form and send it. 800-688-0659 or 407-334-0448. 



Zones List					
Add		Remove		Attach	
Get Info		5 zones		1 down	
				1 new	
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By Stephan Somogyi



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CIRCLE 192 ON READER SERVICE CARD.

Network Watchdogs



Three network-monitoring packages can keep an eye on your network even if you're not there.

By John Rizzo

Computer networks are vital to the flow of information in an organization. But when something goes wrong (a Mac crashes, a router gets confused, or the cable to a printer is unplugged), the hardest part for a network administrator often isn't fixing it but is finding out about it.

To the rescue come *network monitors* — programs that keep an eye on your network and notify you when something unusual happens. We looked at three packages that specialize in device monitoring: the AG Group's Net Watchman 1.3 (\$295), Caravelle's Mac-to-Mac NetWORKS 2.0 (\$995 for unlimited devices; \$295 for 20 devices), and Dayna's Network Vital Signs 1.01 (\$449 for 200 devices). Network Vital Signs is also available as part of Dayna's Network Management System Bundle (\$1,199).

Network monitors don't analyze protocols or collect traffic statistics. Their function is simply to alert you when there's a change in the status of selected network devices, such as when your boss's Mac fails or a printer comes back on-line (see Figure 1). For information about more-sophisticated programs (traffic monitors or packet analyzers, for example), see "Probing for Problems," September '92, page 235.

Attention Getters

Net Watchman, NetWORKS, and Network Vital Signs each use sound and text messages to let you know that something's happened on the network, and all three of the

programs keep text logs of any alerts received. And just in case you don't happen to be sitting at a Mac — which is often the case if you're a busy network administrator — you can also set any of these programs to send a message to a telephone pager.

The programs use standard Mac beeps and quacks to notify you of problems, and you can set them to use voice messages as well ("The accounting server is down," for example). Having your computer talk to you may seem like some gimmick thought up by a programmer who's seen too many "Star Trek" episodes, but in fact, we've found that voice alerts get your attention more effectively than simple beeps do.

NetWORKS has the best approach to voice notification. You create your own voice messages simply by typing in the desired text along with variables that insert specific information, so you can be as specific — or silly — as you wish (see Figure 2). The MacInTalk speech-synthesizing program then "speaks" the message.

Net Watchman comes with a group of prerecorded voices (both male and female) that you can assign to notifications — "bye-bye" when a device goes off-line, "hello" when one appears. Unfortunately, the intonations are a little too cute and can rapidly become annoying. In contrast, Network Vital Signs' voice notifications are spoken in a more staid woman's voice. Both programs also let you use your own recorded sounds for notifications.

Like voice alerts, text alerts can let you know what event has occurred and which device was involved. A typical message with any of these programs might be, "The AFP file server 'Davy Jones' has come back up." NetWORKS is the only one of the three that lets you create your own text messages, with the same variables you use for voice messages. NetWORKS also lets you send alerts via E-mail programs such as Microsoft Mail or CE Software's QuickMail. Version 3.0 (expected to be shipping soon) will be able to send messages via the AOCE (Apple Open Collaboration Environment), which is expected to

be shipping at about the middle of this year. (For more information about AOCE, see "On Beyond E-Mail," March '92, page 191.)

For those who need to know about problems immediately, even if they're away from their Mac, each of the three programs can send a small text message to a telephone pager. Network Vital Signs uses Ex Machina's Notify! paging system (\$149), which you must purchase separately. NetWORKS comes with its own built-in paging software and includes a script editor with which you can create interfaces for specific pagers as well as for a modem or on-line mail services

such as MCI. Net Watchman can use either Notify! or Caravelle's Pager Pro (\$99 for a single user; \$249 for the server version), the stand-alone version of the paging capability that's built in to NetWORKS.

Of the three programs, Network Vital Signs is the only one that goes beyond merely notifying you that a problem has occurred. If a network device fails, for example, Network Vital Signs can launch any application under System 7 — network-management software, say, or even Network Vital Signs itself (the program's monitoring capability works even when the application isn't running). You can

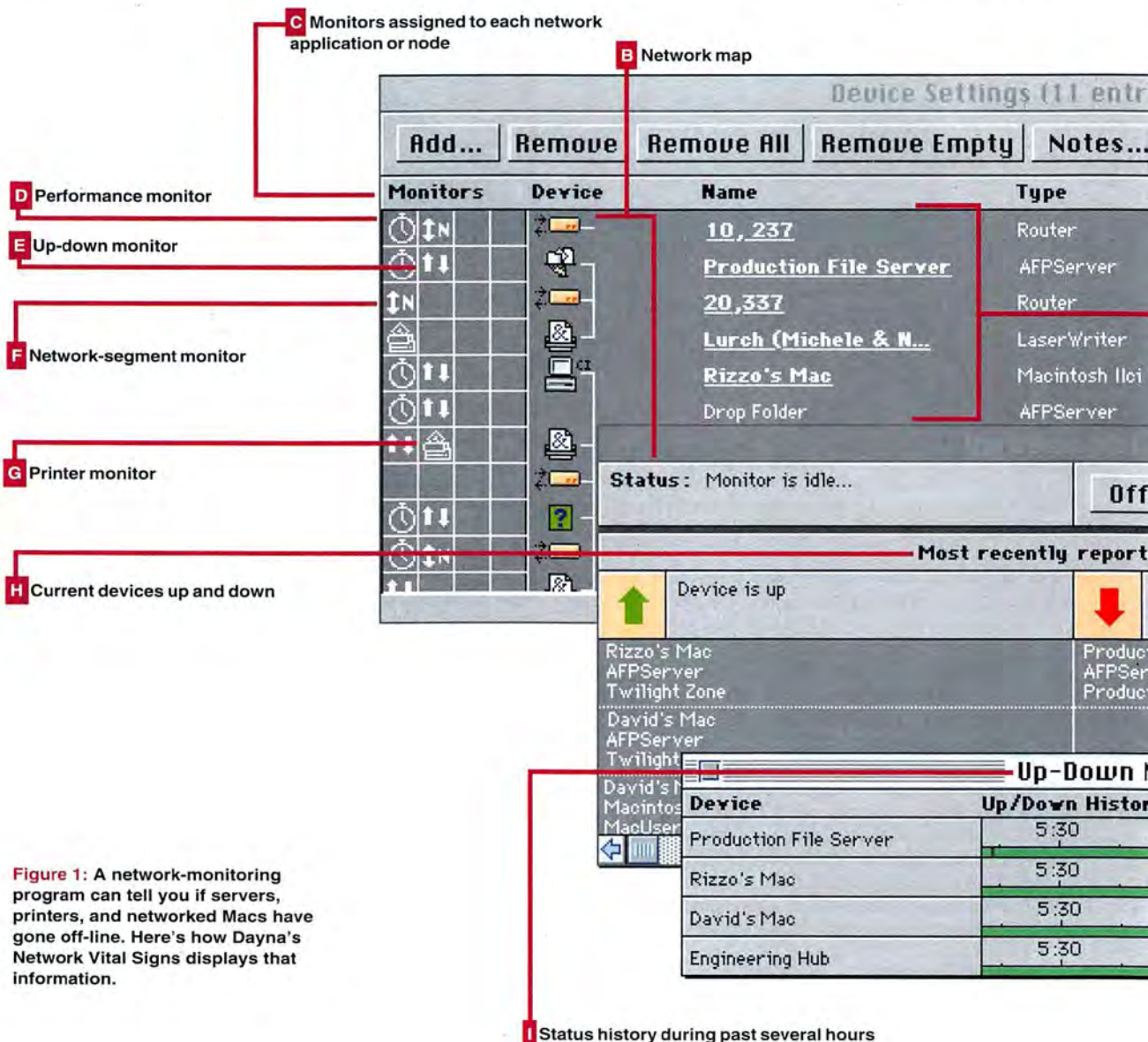


Figure 1: A network-monitoring program can tell you if servers, printers, and networked Macs have gone off-line. Here's how Dayna's Network Vital Signs displays that information.

also instruct a monitor to invoke a macro created in any macro program (such as CE Software's QuickKeys or Affinity Microsystems' Tempo II Plus). You can use this feature to send yourself an E-mail message whenever the program detects a problem on the network, but this method does require more setting up than NetWORKS' built-in E-mail support does.

Node Worriers

Because you probably don't want to be notified every time *any* Mac on the network shuts down, each of these programs lets you select which devices you

want to monitor. NetWORKS and Network Vital Signs have similar methods of selecting *nodes* (Macs, printers, or other network devices) and assigning the types of alerts you want to receive. Once you've chosen the zones you want to scan, you see a list of nodes and *sockets* (network applications running on those nodes). You then specify what kind of notification you want to receive if something goes awry. Both programs let you sort the list of nodes and sockets by type, name, and zone. Network Vital Signs can also sort by network address. Net Watchman lets you designate alerts to classes of sockets (all Timbuktu users, for example) but doesn't have a similar list of individual devices.

Net Watchman is more cumbersome to set up than the other two programs, particularly for large networks. Instead of a simple list of nodes and sockets, Net Watchman presents a logical map that shows icons of nodes, with the sockets listed beneath them. This approach takes up a great deal of screen space, and you end up scrolling around to select nodes and assign notifications. Network Vital Signs also has a Topology view, but the icons are much smaller and take up less of your screen.

All three programs can monitor Macs, printers, and wiring hubs as well as most client, server, and gateway software running on Macs on AppleTalk networks. For those who need to see more than just AppleTalk networks, however, NetWORKS is the only product of the three that can also recognize Macs, PCs, workstations, servers, gateways, and routers on TCP/IP networks. Version 3.0 (which may be available by the time you read this) will also support devices on DECnet and Novell NetWare (IPX) networks.

The extent to which each program monitors your network varies from program to program. Whereas Net Watchman can tell whether or not a printer is on-line, NetWORKS and Network Vital Signs go a step further and alert you if the printer is out of paper or if the paper tray has been removed. A useful feature for file servers is NetWORKS' Space Probe, a utility that notifies you when a Mac is running low on disk space. (To use Space Probe, you must install a control panel on the Mac you want Space Probe to monitor.)

For monitoring AppleTalk routers, we found Network Vital Signs to be the most capable (for more on products that

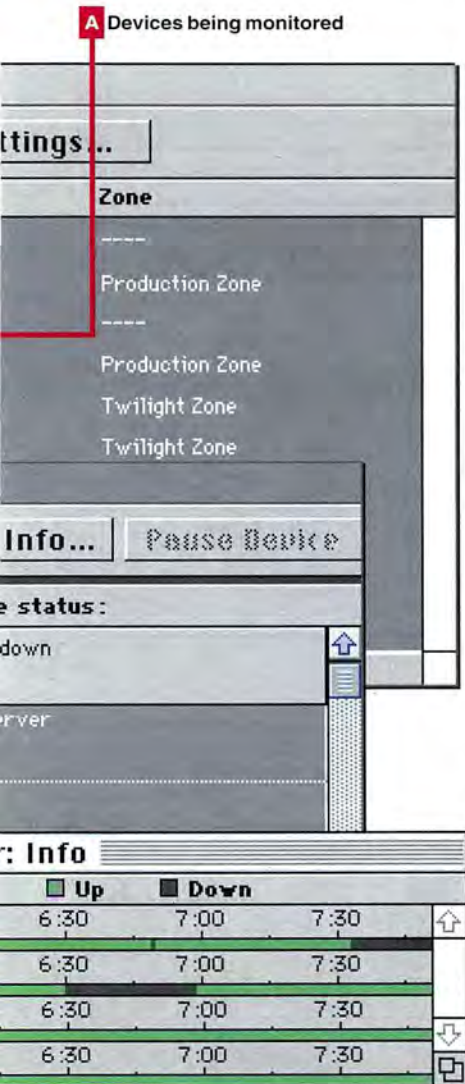
Special Reports

For those who want a specialized view of a network, here are two products that look at fewer devices but offer more information than general network-monitoring packages do.

RouterCheck (\$895), from Neon Software (510-283-9771), is a device-monitoring and fault-notification program designed to monitor only the network plumbing: routers, repeaters, bridges, and gateways. RouterCheck does not see printers or network services, but this is not really a deficiency — network managers in charge of large internets usually don't want to scroll through lists of hundreds of Macs and printers just to find the routers. RouterCheck is designed to recognize specific brands of routers, including Cayman, Shiva, Novell, Apple, Cisco, and Ungermann-Bass.

Like some device-monitoring packages, RouterCheck works with the Notify! pager-notification system to alert you of router problems. Not only does RouterCheck notify you if a router goes down but it also can tell you when a router deviates from normal performance by a preset percentage. RouterCheck can also collect additional statistical information on routers that use SNMP (Simple Network Management Protocol). You can use RouterCheck to see how each router port is configured, and the program displays routing and zone-table information as well — helpful for troubleshooting.

ServerManager (\$395 for 1 server; \$695 for 5 servers; \$995 for 10 servers; \$1,495 for 20 servers), from Santorini Consulting and Design (415-563-6398), is not strictly a monitoring package, but using it is still a great way to manage several AppleShare servers at one time. ServerManager is the logical extension of Apple's AppleShare Admin application, which lets you set up and manage multiple servers over a network from your Mac. With ServerManager, you can add or delete users, create groups, and shut down and restart servers — all from the comfort of your Mac. It also alerts you to a variety of AppleShare-server problems, including crashed servers, servers with more than a certain number of users logged on to them, and servers with low disk space. This package is full of features Apple *should* have included in its Admin program but didn't.



monitor specifically routers and file servers, see the "Special Reports" sidebar). In addition to letting you know which routers are working and which are not, Network Vital Signs can notify you if entire network segments connected to a router's ports go down. It also comes with an add-on module for Shiva FastPath routers that can notify you if the FastPath exceeds a user-definable number of collisions or level of packet traffic. Version 1.1, which should be available by the time you read this, will have two new modules for Dayna's PathFinder and Cayman GaterBox routers.

As for the other two network monitors, Net Watchman can't see any routers and NetWORKS monitors only Shiva FastPath routers.

Network Vital Signs has a few other monitoring tricks. You can assign performance monitors to notify you if a device is having a problem communicating with the rest of your network. The performance monitor sends a specifiable number of echo packets to a node and notifies you if the returning data is corrupted or the response time falls below a certain user-definable level.



Figure 2: You can create synthesized voice alerts from within Caravelle's Mac-to-Mac NetWORKS, using variables as placeholders so that the notification can apply to a variety of devices and problems. In this example, =3 is the device type, =4 is the device name, =2 is the zone name, and =5 is the device status. Other variables include the date and time, the number of devices down, and the AppleTalk node and network numbers.

Table 1: Which Network Monitor Looks Best on Your Network?

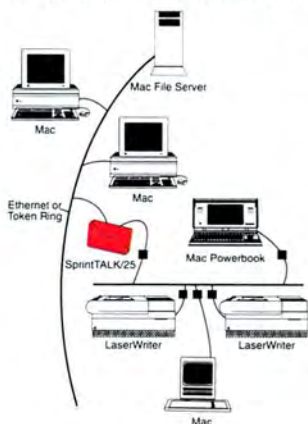
● = yes ○ = no	Mac-to-Mac NetWORKS 2.0 \$\$\$	Net Watchman 1.3 \$\$\$	Network Vital Signs 1.01 \$\$\$%
List price	\$295 (20 nodes); \$995 (unlimited)	\$295 (unlimited nodes)	\$449 (200 nodes)
Pros	More built-in features than other products. Best notification.	Low cost. Solid program.	Good monitoring features. Best interface.
Cons	Fewer monitoring features than Network Vital Signs.	Lacks features and interface of competitors. AppleTalk only.	AppleTalk only.
Notification			
Sound	voice synthesizer with editable messages	recorded sounds	recorded sounds
Text	editable	noneditable	noneditable
Electronic mail	●	○	can access through third-party macro
Pager	built-in	requires Pager Pro or Notify!	requires Notify!
Launches applications	○	○	●
Launches macros	○	○	●
Monitoring			
TCP/IP devices	●	○	○
Routers	FastPath only	○	●
Network segments	○	○	●
Company	Caravelle Networks Corp. 301 Moodie Dr., Ste. 306 Nepean, Ontario K2H 9C4 Canada 613-596-2802	AG Group 2540 Camino Diablo, Ste. 202 Walnut Creek, CA 94596 510-937-7900	Dayna Communications 50 S. Main St., Fifth Floor Salt Lake City, UT 84144 801-531-0600

Give Mac users quick and easy access to any network printer...



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...on Token Ring. Until now, it couldn't be done without routers, time and expertise. But our new SprintTALK™/25T print server makes LocalTalk to TokenTalk easy. It supports up to **eight** LocalTalk devices, including printers, Macs, Powerbooks and compatibles on any 802.5 Token Ring network. Just like our Ethernet version, it configures in seconds, works with all popular Mac applications and displays the selected printers in the familiar "Chooser" window.



SprintTALK/25 connects up to eight LocalTalk devices to high-speed corporate LANs.

...on Novell and Mac. SprintTALK™/200 print servers give Novell and Mac users simultaneous access to the same printers on both Ethernet or Token Ring networks. A built-in high-speed parallel port gives Mac and PC Windows users access to the latest high-speed printers and high-resolution LaserWriters. Even Powerbook users can directly connect to industry-standard corporate LANs.

	Model	Network Connections	Operating Systems	Ports	Printers	Memory	Price
SprintTALK/25	SPTLK25E	Ethernet 10BaseT and BNC Thinner	AppleTalk	DiN8 LocalTalk	Up to 8 LocalTalk printers/devices	512Kb RAM 256Kb ROM	\$545
	SPTLK25T	416Mb Token Ring DB9 and RJ45	AppleTalk	DiN8 LocalTalk	Up to 8 LocalTalk printers/devices	512Kb RAM 256Kb ROM	\$1095
SprintTALK/200 available Q2/93	SPTLK200E/AN	Ethernet 10BaseT and BNC Thinner	AppleTalk/Novell	DiN8 LocalTalk, 1 parallel, 1 Uniport	Up to 8 LocalTalk printers/devices, 1 parallel PostScript, 1 parallel or serial PostScript	2Mb RAM, 512Kb Flash ROM	\$1295
	SPTLK200T/AN	416Mb Token Ring DB9 and RJ45	AppleTalk/Novell	DiN8 LocalTalk, 1 parallel, 1 Uniport	Up to 8 LocalTalk printers/devices, 1 parallel PostScript, 1 parallel or serial PostScript	2Mb RAM, 512Kb Flash ROM	\$1495

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On Display

When you're monitoring several devices at the same time, you need a clear display that provides important information at a glance. Network Vital Signs has the best interface overall and offers many

ways to display information (see Figure 1). The Device Settings window displays a table of devices alongside the type of performance monitor assigned to each one. To view a list of which devices are up and which are down, you go to the

Monitors menu and select one of the monitor types (Up-Down, Performance, Network Up-Down, Printer, and so forth). For each type of monitor, you get a two-column table that indicates the current status of each device using it. You can also elect to see a graph of the status history of the device during the past several hours. The Performance Monitor window can create a bar graph showing the amount of corrupted data and the downtime for each device that's been assigned a performance monitor.


Net Watchman has an iconic map of zone devices that displays small indicators next to the network applications that are listed under each device icon. A down arrow indicates that the device or service is down; a bell icon indicates that the network service is up and being monitored. You can additionally create a text listing of the status of the monitored devices.

NetWORKS' main window includes status indicators in a table of devices being monitored — a useful feature. The indicators let you know if the device is up, down, on hold, or in the process of being tested. To exempt a device from being monitored, you can assign it a Hold status.

The Bottom Line

NetWORKS and Network Vital Signs are both excellent products, but Network Vital Signs 1.01 edges out NetWORKS 2.0 for our overall recommendation. Net Watchman is not a bad product, but it's overshadowed by the other two packages in almost every way.

NetWORKS certainly has some powerful features, including built-in paging and E-mail notification as well as voice synthesizing and do-it-yourself voice and text messages. And it's your only choice if you want to monitor non-AppleTalk networks.

However, Network Vital Signs has the best interface; offers more in the way of monitoring options; and, surprisingly, is the only package that includes on-line help. In addition, third-party add-on products enable Network Vital Signs to duplicate many of NetWORKS' notification features. If you need to monitor AppleTalk-only networks, you can't do better than Network Vital Signs. 

John Rizzo is a *MacUser* technical editor and the author of *MacUser Guide to Connectivity*, published by Ziff-Davis Press.



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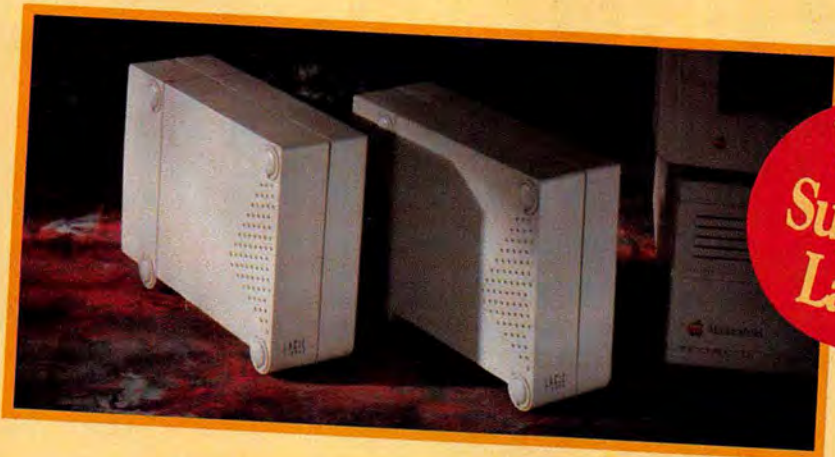
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The Universal Notebook



*Apple's selling PowerBooks to everyone, including lots of PC users,
but communicating with PCs hasn't been
all that easy — until now.*

By John Rizzo

A crowd clamors around the Apple booth at a trade show, listening to a presenter extol the virtues of the PowerBook. Sound like a scene from the last Macworld Expo? Nope. This happened at a recent Comdex, the quintessential PC trade show, typically attended by 150,000 DOS and Windows users — about 3 of whom realize that Microsoft didn't invent copy-and-paste.

Apple is hawking the PowerBook as a laptop for PC users and is having some success at it: The PowerBook is now the most popular laptop computer sold in the U.S. However, some of Apple's earlier pitches to PC users had the odor of snake oil. Apple folks talked up the PowerBooks' PC-connectivity capabilities but forgot to mention that you need to buy several third-party applications to get those capabilities.

Today Apple has basically cleaned up its act and makes some good points in its pitches. For one thing, setting up a PowerBook is simpler and more efficient than squeezing Windows into an Intel-based laptop and adding assorted peripherals. Additionally, the PowerBook has all the comforts of the office built right in (modem, trackball, sound, SCSI, and serial ports) and most of the best-selling Windows applications have versions that run on the Mac.

If that isn't enough — and it isn't — there are plenty of third-party connectivity products for connecting the PowerBook to the PC back at the office. For instance, a PowerBook equipped with Insignia Solutions' SoftPC DOS emulator can

run the same communications software the PC users run. With SoftPC, you don't have to learn to use two communications applications and you can use existing modem scripts.

Of course, PC users aren't the only ones interested in PowerBook-to-PC connectivity. Even if you don't have a PC, the people you visit are likely to. If you'd like to be able to make printouts and share data wherever you go, carrying around some PC connectivity with your PowerBook isn't a bad idea.

Fortunately, products that are targeted specifically at PC-to-PowerBook users are beginning to appear. I looked at two this month: Apple's PowerBook/DOS Companion, a collection of handy utilities, and Software Architects' Laptop Liberator, which takes an innovative high-end approach to moving files between PowerBooks and PCs.

A Bundle of Connections

Apple's PowerBook/DOS Companion (\$219) is a bundle of previously available Apple and third-party Mac/DOS connectivity products that run on a PowerBook. The package gives you everything you need in order to read from and write to DOS floppy disks, move files over a serial line, convert files, print to PC printers, and display on a VGA monitor (assuming that you have a PowerBook with video-out — that is, not a 100, 140, 145, or 170).

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MAC TO PC

DataViz's MacLinkPlus/PC, Apple's Macintosh PC Exchange, GDT's PowerPrint, and James Engineering's MacVGA. The products also work with any desktop Mac, but having them all together in one box — and from a single source — is particularly handy for users of PowerBooks.

The PowerBook/DOS Companion also sells for less than half of what the four products would cost if you purchased them separately.

MacLinkPlus/PC is the long-established champion of file-translation-software packages, with translators

for more than 700 combinations of Mac and PC applications. MacLinkPlus/PC can move files between Mac volumes or between Macs and PCs connected by a modem or a serial cable (a serial cable is included with the software).

Macintosh PC Exchange is Apple's own rather wimpy DOS-mounting utility — it lets you insert DOS disks into your Mac without having the Finder tell you, "This is not a Macintosh disk." It isn't the most flexible DOS-mounting utility available — both Insignia's AccessPC and Dayna's DOS Mounter can read more types of DOS disks and give you more control in matching

particular Mac applications to DOS file types. Still, it's worth having as a freebie with the PowerBook/DOS Companion.

PowerPrint is a good package that enables you to print to non-PostScript non-LocalTalk printers. It comes with drivers for some 400 printers and a serial-to-parallel cable to allow you to connect most PC printers to a PowerBook (or to any other Mac).

Just having PowerPrint and MacLinkPlus/PC in the bundle makes this PowerBook/DOS Companion worth the price of admission, but Apple

also throws in MacVGA, a cable adapter that lets PowerBooks with a video port (the 160, 165c, 180, 210, and 230) drive a color VGA monitor. You can think of MacVGA and Macintosh PC Exchange as the Ginsu knives of the PowerBook/DOS Companion package — but wait; there's more!

Speedier File Transfer

Although MacLinkPlus/PC's serial method of file transfer moves and translates files in one step, it's also one of the slowest ways of transferring a file, short of dropping a floppy in the mail. Laptop Liberator 2.0 (\$249), from Software

With Laptop Liberator, you can access part of your PowerBook's hard disk from a PC, as if it were a PC disk.



Figure 1: If you bought one of those olden-days PowerBook models that lacks a built-in SCSI Disk mode, you can still do fast SCSI file transfers to a PC (or a desktop Mac, for that matter) with Software Architects' PowerBridge connector and Laptop Liberator software.

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BRIDGES MAC TO PC

Architects, enables you to establish a SCSI connection to move files more quickly between a PowerBook and a desktop PC. It's basically a software package, but it additionally includes a special hardware connector for some of the older PowerBooks.

SCSI may be a headache to get working when you have four hard drives, a CD-ROM drive, and a scanner attached to your Macintosh, but it has one redeeming value for file transfer: speed.

A file that takes more than 20 minutes to transfer over a serial cable can be transferred in less than 1 minute over a SCSI connection. A SCSI connection is also several times faster than Ethernet.

Laptop Liberator 2.0 makes its connection to a PC by using the SCSI Disk mode, which is built in to most of the PowerBook models. (The included PowerBridge connector adds the SCSI Disk mode for the PowerBook 140, 145, and 170, which normally don't have that feature.) Usually, SCSI Disk mode lets you connect a PowerBook to a desktop Mac's SCSI port and fool the desktop Mac into thinking that the PowerBook is a hard drive. Laptop Liberator takes this capability one step further: It lets you connect the PowerBook to a PC that has a SCSI port. (For connecting to PCs without a built-in SCSI port, Laptop Liberator supports almost a dozen common add-in SCSI controller cards for PCs.) A portion of the PowerBook's hard disk can then be accessed from the PC as if it were a PC disk.

In order to convince the PC that it's connected to a PC drive instead of a PowerBook, you need to create a DOS partition on your PowerBook's hard disk (the partition will be the only part of the PowerBook disk that the PC sees). To

create the DOS partition, you first need to reformat the PowerBook's hard disk with the Liberator partitioning utility, which is derived from Software Architects' well-regarded Formatter application (make sure you back up the contents of your hard disk first, of course, because formatting erases everything). You can use Liberator to set the SCSI ID of the DOS partition; if you need to change it later, just use the SCSI Disk Mode ID portion of

Apple's PowerBook control panel. For PowerBooks that don't have built-in SCSI, Laptop Liberator includes the special SCSI-ID utility.)

Because SCSI Disk mode enables the DOS partition on your PowerBook to look like a PC disk to the connected PC, Laptop Liberator can use each platform's standard methods of moving files. On the PowerBook, you just click and drag files between the Mac and the DOS volumes. In DOS, the DOS partition on the connected PowerBook becomes drive D: or E: (or the first available letter). You can use the DOS Copy command to move files between the PowerBook partition and a PC volume. In Windows, you can use the File Manager to click and drag between the mounted volume and a PC disk.

The physical connection is similarly easy. If you're using one of the PowerBooks with a built-in SCSI Disk mode, you connect the PowerBook's SCSI cable directly to the PC's SCSI cable. The PowerBook software does the rest (no PC software is required). If you're using a PowerBook 140, 145, or 170, you use the PowerBridge connector included with Laptop Liberator. The PowerBridge connects a PowerBook HDI 30 SCSI cable to a standard 25-to-50-pin SCSI cable,

The PowerBridge is more than a mere cable converter: It contains circuitry described as a 'smart switch.'

Table 1: PowerBook-to-PC Products

	Laptop Liberator 2.0	PowerBook/DOS Companion
	\$\$\$	\$\$\$
List price	\$249	\$219
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BRIDGES MAC TO PC

which goes to the PC. Cables are not included, but the standard SCSI cable comes free with every hard drive you buy, so you should be able to find one easily.

The PowerBridge is more than a mere

cable converter: It contains circuitry described by Software Architects as a "smart switch." This circuitry prevents signals from the PC from colliding with those from the PowerBook. It also provides the SCSI-Disk-mode capability for

the PowerBook 140, 145, and 170. The PowerBridge requires power from the PowerBook's AC adapter; you power the PowerBook by plugging a small cable coming out of the PowerBridge in to the AC socket of the PowerBook (see Figure 1).

The PowerBridge connector and Laptop Liberator's SCSI-ID utility also let the PowerBook 140, 145, and 170 run in SCSI Disk mode while connected to desktop Macs — something these models can't ordinarily do. Laptop Liberator does not, however, enable non-PowerBook Macs to connect to PCs or run in SCSI Disk mode; it's purely a PowerBook product.

Like Apple's PowerBook/DOS Companion, Laptop Liberator 2.0 comes with Ginsu knives. In this case, the freebie is Dayna's DOS Mounter, which complements Laptop Liberator very well. It's DOS Mounter that mounts the DOS partition on the PowerBook's desktop so that you can click and drag between Mac and DOS partitions.

Back to the Desktop

Speaking of DOS Mounter, Dayna has upped the ante in the DOS disk-mounting wars with DOS Mounter Plus (\$99.95), which now includes the company's NetMounter utility. NetMounter lets individual users mount Novell NetWare servers on the desktop without requiring NetWare for Macintosh. DOS Mounter Plus also sports a spruced-up interface and two other utilities, MultiMounter and MultiFormatter, which let you mount, format, and partition DOS removable media, including magneto-optical cartridges.

The new version puts DOS Mounter on a par with, and possibly ahead of, Insignia's Access PC, which has all of DOS Mounter Plus' functionality except the ability to access NetWare servers. And it leaves Apple's Macintosh PC Exchange, which works only with floppies, even farther behind.

Of course, I'm still waiting for Apple to see the error of its ways and build Macintosh PC Exchange in to System 7 instead of charging extra for it. Think of it as purging that last whiff of snake oil out of those pitches to unwary, Comdex-crazed PC users. ☞

John Rizzo, a *MacUser* technical editor, is the author of *MacUser Guide to Connectivity*, published by Ziff-Davis Press.



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According to *MacUser* magazine, if you want to combine Macs and PC-compatibles onto one network—especially if you want to share files among all platforms—a non-Mac file server is probably the way to go.

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PERSONAL MACINTOSH

No contest: This month's award for ridiculous rodent-related product goes to the Mouse Arena, a mouse pad (or "high-tech **mouse workstation**," as the brochure states) that its own inventors admit looks like a "remote-controlled Frisbee." Probably the first mouse pad in history to come with assembly instructions. 800-663-6764 or 514-444-9488. \$29.95.

Common sense: For those who are HyperCard-carrying members of the American Civil Liberties Union or need to brush up on some fundamental civil-liberties issues, Express Yourself puts a new twist on the concept of freeware. This HyperCard stack, available from the ACLU of Northern California, examines First Amendment issues in a lively style that's aimed at middle- and high-school students. **Rush Limbaugh fans:** Not your cup of tea. Express Yourself fits on one disk and runs on any Mac — the better to make it easily copied and distributed. 415-621-2493. \$10.

Classics: The second volume of The Voyager Company's So I've Heard CD-ROM series (see Personal Best, April '93, page 221) is out now. The Classical Ideal examines the period dominated by Haydn and Mozart. Alan Rich provides the musicological commentary, and an included coupon gets you \$2 off the program's recommended recordings at Tower Records. \$24.95. ♦ And rock



fans can now rejoice that Voyager has turned its sights on one of pop music's cultural landmarks: **The Beatles' A Hard Day's Night**. In addition to providing the entire classic film in QuickTime

format, this CD-ROM includes the entire script (including cut and improvised scenes), theatrical trailers, and a couple of other Richard Lester-directed short films. Beatles fans will be lining up to buy CD-ROM players when they see this one. 800-446-2001 or 310-451-1383. \$39.95.

Days of the Dead: Meanwhile, Deadheads will be lining up to see the Grateful Dead, just as they have been for the past quarter of a century. The only difference is that the Mac-literate among them will be tripping to the tune of the Daily Tripper: the first official **Grateful Dead PIM**. This FileMaker-based calendar and scheduling package, from BrainDance Development, is packed with sound, animation, concert images, and other Dead data. No truth to the rumor that easy-listening fans can look forward to the Doris Day Runner. 415-454-9876. \$69 (FileMaker Pro 2.0 not included).



Decorative touches: By now, it's no secret that screen savers don't do much to save screens. You can get equally colorful and whimsical conversation pieces, though, that may help keep dust from suffocating your motherboard. Think of these computer covers from NiteCaps as tea cozies for your Mac. 415-665-0668. \$25 to \$40, depending on size. ♦ When it comes to patterns, no one yet has topped M. C. Escher. If you'd like one of his designs on your wrist rest or mouse pad, call Computer Expressions. The company has an exclusive license for Escher mouse workstations (no assembly required). 800-443-8278 or 215-487-7700. \$4.50 to \$7.50. 🖱



By James Bradbury

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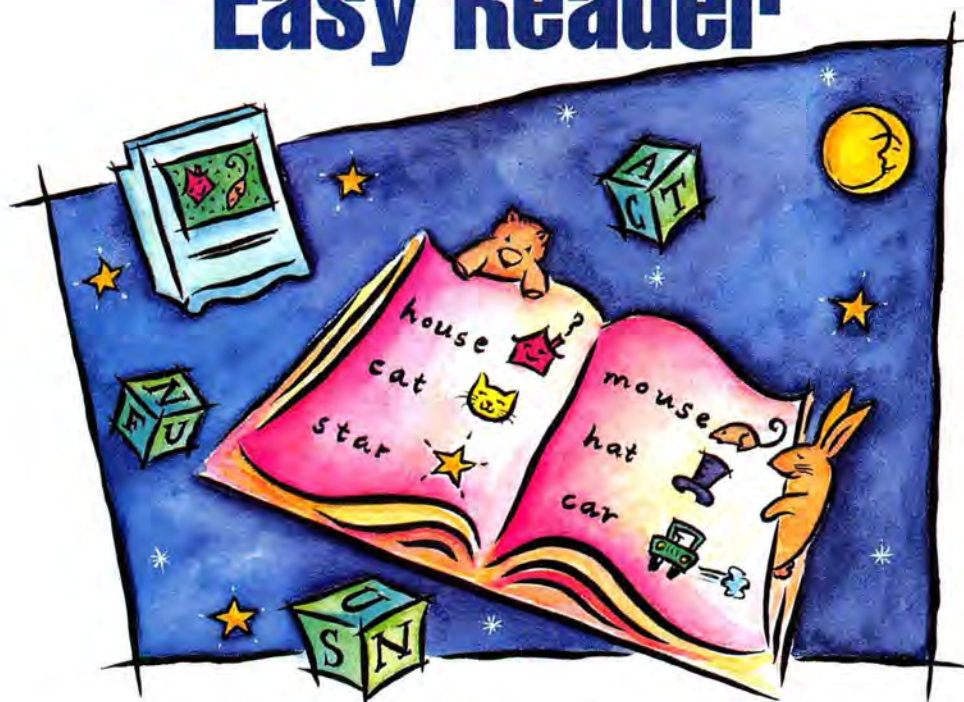
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CIRCLE 83 ON READER SERVICE CARD.

Easy Reader



Want to get your kids hooked on books? Here are four colorful, interactive programs that make learning to read fun.

By Bob LeVitus

I want my kids to read, and I want my kids to *like* reading. Who doesn't? So I think you'll be happy to learn about a quartet of games for youngsters that makes learning so enjoyable that kids barely notice they're learning.

That's what makes Sierra On-Line's Alphabet Blocks, The Learning Company's Reader Rabbit 2, Optimum Resource's Stickybear's Reading Room, and Discovery Software's Word Tales so neat — kids like these programs and play them repeatedly.

Of course, nothing can replace personal instruction, and these programs are not designed to do so. These games alone cannot teach your child how to read, but they can help by reinforcing reading skills that involve letters, letter sounds, vowel sounds, words, compound words, rhymes, and more.

There is no best one of the four programs: They're all good. In evaluating the programs, I focused on two considerations that are very important in children's products — replayability and kidproofness. Replayability is the "Will kids want to play it again and again?" factor. The key to learning is repetition, so it's important to know that a kid won't get sick of a program in five minutes. All four programs scored high on this count. Kidproofness — the "How fast can an unattended child drag really important files to the Trash?" factor — was another story. Kidproofness is extremely desirable if you want to let your child use the computer unattended and still have a computer when you get back. The kidproofness of

Alphabet Blocks was unexcelled, and Word Tales was a close second. (By the way, if your kids use your Mac, check out Apple's At Ease software. It is a simplified file launcher that effectively childproofs your Mac by making the Finder and the Control Panels folders inaccessible. Another good kidproofing device that even kids enjoy is Kid Desk, from Edmark, which lets your children customize their own desktops — complete with sound and pictures — but blocks access to adult files.)

Before you buy one of these programs, however, make sure you'll be able to get the most out of them with the Mac setup you already have. Some of the programs require color and/or a CD-ROM drive; most require a lot of RAM. If you're ordering over the phone, ask the salesperson what the system requirements are; if you're buying a program off the shelf, check the box for hardware requirements.

This column was a joint effort. My just-turned-four-year-old daughter, Allison, and our almost-six-year-old neighbor, Clint, gave each program a thorough workout. Other, mostly older neighborhood kids served as executive consultants.

Stickybear's Reading Room

Stickybear's Reading Room, for children ages four through eight, contains four games that stress word recognition, sentence construction, comprehension, and phonetics. You can record and play your child's voice on a Mac with a built-in

How Butterflies Transform

The butterfly passes through several stages in its glorious transformation from egg to the completed creature that we all visualize as the butterfly. The adult female lays between one hundred and several thousand eggs throughout her lifetime each with the potential of becoming an adult butterfly itself.

Each egg, so tiny that it can only be seen by the human eye with the help of a microscope, is laid on or near a plant on which the newly hatched grub will be able to feed. These eggs are often green or yellow, but can also be found in shades of blue or red, each with a shell-like design covering it.

Usually in the spring or summer a tiny caterpillar, or grub, will hatch from the egg. This wormlike creature almost immediately begins to feed as it will consume the majority if not all of its nutrients during this phase of its life.

The caterpillar will continue to eat until it has eaten so much that its skin can no longer contain the newly acquired mass. The skin then bursts and the caterpillar will shed it in order to have it replaced by a newer and larger one. This process continues for weeks as the caterpillar increases in size, several times its original mass.

Often during the time of fall, the caterpillar will then either spin a silken pod from which it suspends itself by its hind legs or it will fasten its body upright by silken threads to a twig creating a chrysalis or exposed pupa. Usually after spending the winter months dormant, the final stage of transformation will take place.

The shell of the chrysalis is broken open and the creature that emerges is barely recognizable as the butterfly that it will become. Its wings are crumpled and kept close to its moist limp body. It will remain clinging to the cocoon or a nearby branch as its form gradually begins to become dry and firm.

It moves its wings slowly at first with little strength but as they dry it is soon ready to take flight. The creature that ascends into the air has been through its final stage of development and is now the completed butterfly. This butterfly is now called the imago, or perfect insect.

How Butterflies Transform



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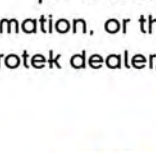
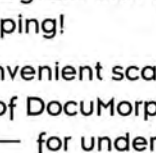
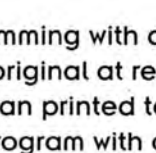
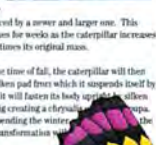


The caterpillar will continue to eat until it has eaten so much that its skin can no longer contain the newly acquired mass. The skin then bursts and the caterpillar will shed it in order to have it replaced by a newer and larger one. This process continues for weeks as the caterpillar increases in size, several times its original mass.

Often during the time of fall, the caterpillar will then either spin a silken pod from which it suspends itself by its hind legs or it will fasten its body upright by silken threads to a twig creating a chrysalis or exposed pupa. Usually after spending the winter months dormant, the final stage of transformation will take place.

The shell of the chrysalis is broken open and the creature that emerges is barely recognizable as the butterfly that it will become. Its wings are crumpled and kept close to its moist limp body. It will remain clinging to the cocoon or a nearby branch as its form gradually begins to become dry and firm.

It moves its wings slowly at first with little strength but as they dry it is soon ready to take flight. The creature that ascends into the air has been through its final stage of development and is now the completed butterfly. This butterfly is now called the imago, or perfect insect.



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microphone, and the program is bilingual, presented in both English and Spanish. The games are colorfully illustrated.

Word Bop gives you a cannon that you use to shoot at pictures that change into words or words that turn into pictures. When you hit the target, a human voice pronounces the word.

Word Match asks you to match a word or picture with one of six choices. Your correct response is rewarded with some animation and sound effects, but if you respond incorrectly, a gentle voice urges you to try again.

Word Find is a complete-the-sentence game in which you select the missing word from three choices. If you choose correctly, you will hear the sentence and be presented with a brief animated sequence.

The last game, Sentence Builder, may be the most clever. You choose a beginning, a middle, and an end for a sentence, and then the sentence is read to you and enacted by animated characters. If you build a sentence that reads, "The helicopter flies behind the bird," you will see a cartoon of a helicopter flying behind a bird.

Stickybear was a big hit with both of my play-testers. Although some of the reading concepts are too advanced for four- and five-year-olds, they enjoyed the program a lot and asked to play again and again. Older kids who have more-advanced reading skills are likely to enjoy it even more.

Reader Rabbit 2

Reader Rabbit 2 is the sequel to the popular, award-winning Reader Rabbit. Like Stickybear's Reading Room, it contains four games, but each game has four levels of difficulty. Reader Rabbit 2 teaches first- and second-grade reading skills, such as identifying vowel sounds, matching rhymes, learning opposites and homonyms, and building compound words. The games contain lots of attractive illustrations. Sound and animation, usually featuring the cute Reader Rabbit character, appear throughout as a reward for correct responses.

Word Mine teaches compound words by showing you half of a compound word. (At the easiest level, you also see a

picture that illustrates the compound word.) You must select the correct word from six possibilities.

In Vowel Pond, you hear a vowel sound and a word that uses it. As words swim by on-screen, you choose only those that have that vowel sound. At the game's most difficult level, you must differentiate between long and short vowel sounds.

Match Patch teaches rhyming. You click on a carrot to reveal one of 12 hidden words and then click on any other carrot to try to find the word that rhymes with it. This game is similar to the old television game show "Concentration."

Alphabet Dance has you arrange four words in alphabetical order. When you do, four characters dance to a catchy tune.

Reader Rabbit 2's kidproof rating is fair. Although other applications and the Finder on your system are hidden when the game is active, the menu bar is still accessible.

My play-testers were a bit young for Reader Rabbit 2, but they thoroughly enjoyed the prequel, Talking Reader Rabbit. Although they are similar, the two Reader Rabbit programs are designed for different age groups. Reader Rabbit 2 is for older kids, ages five through eight, whereas the original Talking Reader Rabbit is for three- to seven-year-olds. It's obvious that a great deal of thought and craft went into creating the Reader Rabbit games; they're both very good.

Word Tales

Word Tales, which focuses on teaching word recognition and initial-letter sounds, offers the most-elaborate sound and animation of any of these programs, which is logical, because it comes on a CD-ROM. (A floppy-disk version, which includes less animation and sound, is available for \$10 less.) Word Tales has only one game — Word Tales — but it is diverse enough to provide many hours of learning and entertainment.

An elflike animated character named Milo pronounces a word and shows you an animated sequence depicting it. The word then appears with its first letter

An important consideration in children's products is replayability — the key to learning is repetition.

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missing, and you must select the proper initial letter from three possibilities. Milo then speaks the word you've created. If you choose the right letter, you get to play in an interactive animated scene.

Word Tales' kidproofness rating is excellent, unless you have a large monitor. On most monitors, the Finder and the menu bar are hidden when the game is active and you can deactivate the Quit command by Option-clicking on it. On my 20-inch color monitor, however, the Finder wasn't hidden effectively.

Word Tales is a charming game. Its detailed animation sequences make it the kind of game your kids will want to play over and over. All the kids I showed it to really liked the interactive scenes, which remind me of one of my daughter's favorite CD-ROMs, "Just Grandma and Me," from Brøderbund.

Alphabet Blocks

Alphabet Blocks is for younger kids — even kids who can barely identify letters by name. It includes four games

and teaches four basic reading skills: matching letters, identifying letters by name, identifying letters by sound, and identifying words that begin with a letter sound.

Alphabet Blocks features Coach Jack, an animated jack-in-the-box, and Coach Bananas, a cute young monkey. Absolutely no reading is required — both coaches speak every instruction. The animation is clever and upbeat, and you get verbal encouragement and an animated surprise whenever you answer correctly.

If you make an incorrect choice, there's no negative response. Instead, the program makes things easier. For example, if you cannot identify a certain letter out of the entire alphabet, the game will hide 20 of the letters and request that you identify the letter out of the 6 that remain.

Alphabet Blocks offers "grown-up choices," which enable you to tailor the program to your child's reading level. You can choose letter sounds, letter

names, or both; cursive or block letters; uppercase or lowercase letters; and scrambled letters. This game's kidproofness rating is excellent. Not only are the Finder and the menu bar inaccessible when the game is active but the Quit command can also be deactivated by adults and the Grown-up Choices dialog box can be password-protected in order to foil prying children.

Alphabet Blocks was the top choice of my play-testers, in part because it was the most appropriate game for their reading levels. They liked its clever animation and related well to the characters and their voices. (When one of the coaches says, "Bye-bye," Allison waves at the monitor and sadly replies, "Goodbye.")

The Bottom Line

Because there isn't a bad program in the bunch, the tricky part is to pick the one appropriate for your child's reading level. Choose Alphabet Blocks if you have prereaders; it requires no reading



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skill, so it is perfect for those three-, four-, and even five-year-olds. If your child is just starting to read, you can't go wrong with either Stickybear's Reading Room or Word Tales. Stickybear offers

more variety, a larger vocabulary, and optional Spanish instruction, but Word Tales is more enjoyable and entertaining and may have a higher replayability factor. For more-advanced readers (first- or

second-graders, say), Reader Rabbit 2 is the perfect choice. 

Bob LeVitus is the author of *Dr. Macintosh's Guide to the On-Line Universe*.

Table 1: Head-Start Programs

	Alphabet Blocks ★★★★½	Reader Rabbit 2 ★★★★	Stickybear's Reading Room ★★★★	Word Tales ★★★★
List price	\$49.95	\$59.95	\$59.95	\$59.99 (CD-ROM) \$49.99 (floppy disk)
Pros	Money-back guarantee. Excellent sound and animation. "Grown-up" options. Kidproof.	Has 4 games with 4 levels each. Good graphics, sound, and animation.	Bilingual. Has 4 games.	Great animation. Interactive. Good sound and animation. Kidproof.
Cons	Too easy for older kids.	Hard for some 5-year-olds.	No black-and-white support. Only 1 level of difficulty.	Just 1 activity.
Ages	3 and up	5 - 8	4 - 8	4 - 7
Company	Sierra On-Line P.O. Box 485 Coarsegold, CA 93614 800-326-6654 209-683-4468	The Learning Company 6493 Kaiser Dr. Fremont, CA 94555 800-852-2255 510-792-2101	Optimum Resource 10 Station Pl. Norfolk, CT 06058 800-327-1473 203-542-5553	Discovery Software 3500 W. Olive Ave. Burbank, CA 91505 818-955-9999

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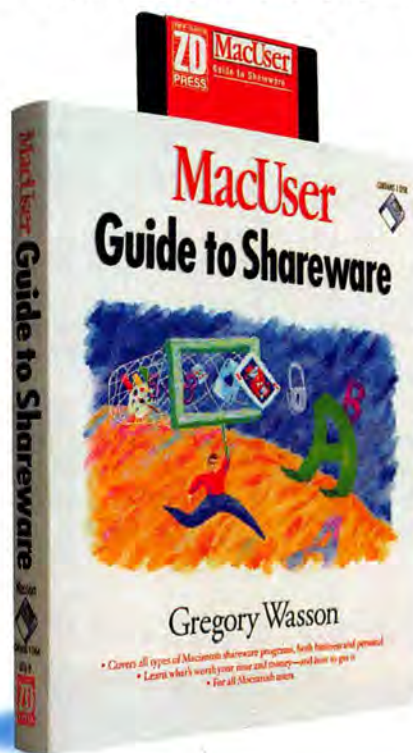
- "Top Honors" *MacUser* 11/92
- ★★★★★ *Macworld* 8/92
- Designed for use with all Macintosh models
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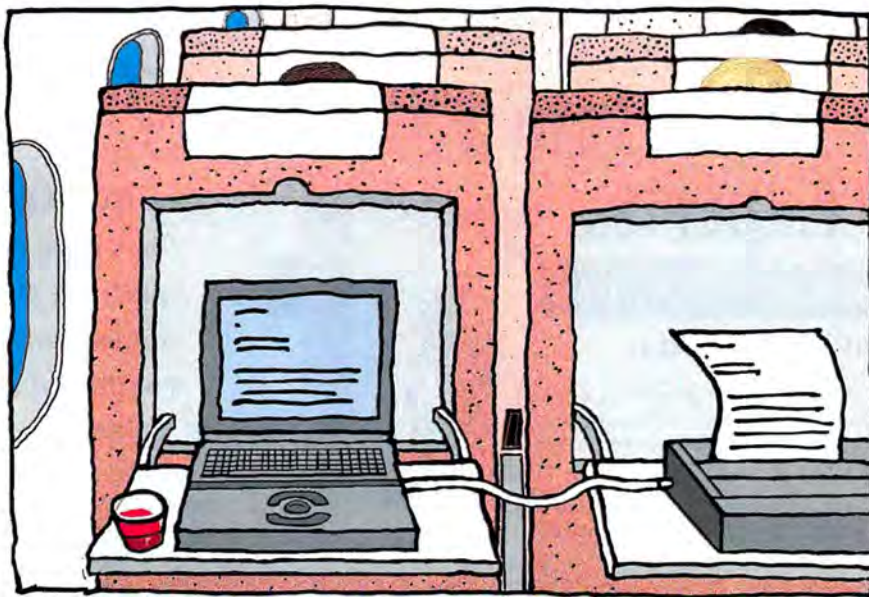
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PostScript Printing to Go



If you've lamented leaving your PostScript printer behind when you strike out on the road, there's now a portable solution that might satisfy you.

By Henry Bortman

The first Apple LaserWriter cost \$5,000. It was big. It was heavy. It was slow. But it was a PostScript printer, with output that, for its time, was nothing short of amazing. People bought it. Lots of people. So many people that a whole new industry — desktop publishing — grew up around it.

There are now dozens, perhaps hundreds, of PostScript-printer models. They come in all sizes and shapes, with engine speeds of anywhere from 4 to 50 pages per minute. And prices have dropped dramatically since the old days of the \$5,000 LaserWriter.

But two things have not yet happened. No one has made a PostScript printer small and light enough to be portable. And no one has sold a PostScript printer for less than \$1,000 — until now. Mannesmann Tally has now done both, with the MOBILEWriterPS printer.

Priced at \$999, the MOBILEWriterPS weighs just over 8 pounds — a pound more than a PowerBook 145, 160, 165c, or 180 — and is about the same size and shape as these PowerBook models. So you can carry your PowerBook on one shoulder and your printer on the other and maintain that balanced feeling so important for running down the interminable corridors in airport terminals. The MOBILEWriterPS has a built-in LocalTalk port and uses the standard LaserWriter driver. It appears in the Chooser just as any other PostScript printer does, making it a reasonable choice for an office printer as

well as for traveling — particularly if you are short on desk space. If you're a Duo owner, you can set the printer on top of the Duo Dock for maximum space efficiency. The MOBILEWriterPS also has a parallel port, so you can use it with DOS and Windows computers as well as with Macs.

The PostScript RIP (raster image processor — the computer inside the printer) uses Microsoft's PostScript clone, developed by Bauer (the predecessor to Microsoft's TrueImage PostScript clone). And it's fast: It beats out other portable printers by a significant margin. The speed of most portable printers' engines can be measured in minutes per page. The MOBILEWriterPS's engine is rated at 6 pages per minute, almost as fast as the majority of today's desktop printers.

The 300-dpi engine's use of thermal-wax-transfer technology is unusual for a black-and-white PostScript printer. Although thermal-wax engines are widely used in color printers, most black-and-white PostScript printers are toner-based. The quality of the thermal-wax output — what I saw was beta — isn't quite on a par with that of the toner-based engines or even of the high-resolution inkjet engines in printers such as the HP DeskWriter and Apple StyleWriter II. You wouldn't want to use a MOBILEWriterPS to print camera-ready halftone images. But for printing correspondence, handouts for a presentation, or faxes you receive on your PowerBook's internal fax modem, it should be more than adequate. Mannesmann Tally recommends using high-quality laser paper for the best

results. But if you don't feel like carrying a ream of special paper with you on a business trip, you can use any type of standard paper. The input tray holds as many as 80 sheets. Thermal-wax ribbons, good for printing 150 pages apiece,

cost \$15 each (sold in boxes of five).

Conveniently, 150 is also the number of pages you can print on a single charge of the printer's built-in NiCad battery. In order to extend battery-charge life when running on battery power, the

MOBILEWriterPS goes to sleep automatically after 30 minutes of inactivity. The printer can also run off AC power.

The MOBILEWriterPS was scheduled to have shipped in April. If you're interested, give Mannesmann Tally a call at 800-843-1347 or 206-251-5524.

If you can live without PostScript when you're on the road, you might want to give the Kodak Diconix 701 portable inkjet printer a look. Formerly of interest

The MOBILEWriterPS is both the first truly portable PostScript printer and the first PostScript printer for less than \$1,000.

only to DOS and Windows users, the just-under-6-pound printer is now available with what Kodak calls the Mpower 701 interface kit. The kit contains a serial-to-parallel converter cable that enables Macs (which have serial output ports) to print to the 701 (which has a parallel input port). The kit also provides a Macintosh driver for the printer. The printer costs \$549, and the interface kit an additional \$79.

The 701 has a 300-dpi engine and four modes (in decreasing order of resolution): Best, Normal, Fast, and Draft (text only in this mode). The highest speed the printer can attain (in Draft mode) is 3 pages per minute. The 701's input tray holds as many as 30 sheets. Its rechargeable NiCad battery — the same type as that used by Sony Hi8 camcorders — is good for as much as 50 minutes of unplugged-in printing. Oh, by the way, the battery (\$49.95) isn't included; you have to buy it on your own, which brings the actual total price of the printer to \$677.95.

You can reach Kodak at 800-344-0006 or 716-253-0740.

Packing Your Bags

No, I'm not going to talk about travel cases for PowerBooks. Not this month, anyway. This is another chapter in the never-ending saga of the race to develop the ultimate PowerBook utility. The latest contender, Santorini, has taken a novel approach. Its new program, TravelBag, is based on the notion that there are groups of files you need to manage in particular ways before going on a trip,

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while on the road, and when you get back. Although synchronizing files between a desktop Mac and a portable Mac is one of these management functions — and there are several file-synchronization utilities that do this job quite well — TravelBag goes beyond merely synchronizing files.

TravelBag uses the metaphor of packing various bags in preparation for a trip. A bag consists of one or more items, each of which performs a specific function. For example, you may want to temporarily offload some files from your PowerBook's hard disk before you hit the road, to make room for new files you anticipate you'll be creating while you're away from your office. TravelBag lets you do this by adding an Offload item to your bag. You can set an Offload item to reverse itself automatically when you return. Or you may want to hide certain information from prying eyes. You can add a Folder Hiding item to a bag to accomplish this task. If you need to gather a set of documents from various shared volumes on the network before striking out on the road, you can add a Gather item to your bag. This can work either by explicit selection — you pick the precise files and folders you want to gather — or through an automatic gathering of items based on criteria (file type, modification date, and so on) you establish when creating the item.

TravelBag also has a feature that lets you schedule items in a bag to execute at regular preset times. For example, if you want to back up a particular set of files to a floppy disk each night while you're away on a trip, you can set timers for a backup item, and insert a floppy disk into your PowerBook's floppy-disk drive each night before you go to sleep, and TravelBag will take care of the rest.

One particularly useful feature of TravelBag is its ability to store locally a copy of a remote volume's directory. This enables you to create bags while you're on the road that operate on files and folders that are not actually available at the time you create the bags — ones that exist, for example, on a remote AppleShare server volume to which you are not connected when you create the bag. When the bag's instructions run, TravelBag automatically uses AppleTalk Remote Access to connect to the remote server and perform the specified actions.

Bags can also contain subbags, so you can create one-or-two-item modules and

string them together into larger bags. The possibilities are endless.

As of press time, the first TravelBag product (\$99) was due out in March or April of 1993. Santorini plans to release a set of TravelBag functions later in the

year that will go even further in managing ARA-based activity. The most exciting of these is fault-tolerant file transfers. If you've tried downloading a 1- or 2-megabyte file over the phone, only to have the line drop — and lose the entire



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file — just as the last block of data is transferred, you'll love fault tolerance. It lets your Mac remember how much of a file has been successfully transferred and call back to complete the transfer.

Another feature of the ARA-focused release is automatic file compression. By running software on, say, your desktop Mac, you will be able to use Travel-Bag to automatically compress files before transferring them over a Remote Access connection and then decompress them after transfer. The savings in connect time should be significant.

These are only some of the functions Santorini is promising. To get the full story, call the company at 415-563-6398.

CPU, Take Two

Meanwhile, Connectix is about to release version 2.0 of its popular PowerBook utility, CPU. The main new feature is file synchronization. Don't go away yet. I know file synchronization is becoming a de rigueur feature of PowerBook utilities. There are even stand-alone

file-syncing utilities. Couldn't these folks come up with something more exciting?


Well, actually, they did. It's in the interface. CPU 2's file synchronization uses the Finder to create groups of files

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to have the line drop and
lose the entire file?**

You'll love fault tolerance.

and folders to be synchronized. Using an AppleScript-like technique — it doesn't require AppleScript, though — CPU 2 creates script icons on the Mac desktop that, when you click on them, open up as Finder-like windows. You create a list of files and folders to be synchronized by dragging their Finder icons into these windows. Although it looks as if you're moving the files, you're actually creating a set of aliases to the

files that, together, comprise a script or macro that controls the synchronization process.

So you can, for example, copy a bunch of files and folders from your PowerBook's internal hard disk (they don't all have to come from a single folder on the originating volume) to a script window on a floppy disk, as a way of creating a kind of floppy-disk backup. Or you can mount some shared volumes from Macs or file servers on your office network, copy files from these servers to a script window on your PowerBook's hard disk, and then run the script before disconnecting from the network to make sure you have the most up-to-date version of the selected files. These aren't particularly creative and new uses for file-synchronization software, but the ease of using the standard Finder interface in this way for accomplishing the task is a significant innovation. I was impressed. See what you think. 

Henry Bortman is MacUser's technical director.



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BIO you'll ever
"Best of 1992"
Model 95 is just
out perfect."
recognition of the
personal printer.
year 1992

—The Washington Times
Sept. 2, 1992

—Home Office Computing
July 1992

"A luxury printer at a
bargain basement
price."
—PC/Computing
June 1992

—PC/Computing
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—PC Magazine
January 12, 1993

—PC Magazine
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CIRCLE 90 ON READER SERVICE CARD.



OR



HOW TO BE NEAT, PRECISE AND ORGANIZED. WITHOUT BECOMING ONE OF THOSE OBNOXIOUS PEOPLE WHO ARE NEAT, PRECISE AND ORGANIZED.

Step 1: Load Now Up-to-Date 2.0, the software that lets you schedule events, set reminders, manage To Do lists, print calendars and keep your associates informed, allowing you to become disgustingly organized.

Step 2: Notice how incredibly easy Now Up-to-Date is to use. Totally customizable. 100% non-fascist. Just click on a date, enter your info, bang, you're done.

Step 3: Think to yourself, "Wow, calendar software that's actually faster and easier than

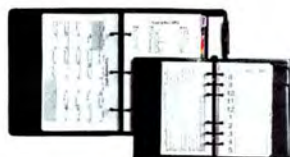


the old pen and appointment book

approach. Amazing." Step 4: If you are on a network, share events from



Now Up-to-Date lets you schedule appointments and To Do's instantly—just click on the date you want and then enter your information.



Calendars can be printed in all major appointment book sizes and formats, in a wide variety of views and styles. You can even print out wall charts.

your calendar with the other folks on your network. In return, they'll no doubt share meeting dates and whatnot with you. Not on a network? No sweat, Now Up-to-Date still works fine all by itself.

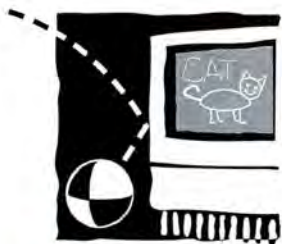
Step 5: Fly to Zimbabwe and bring up your calendar on your PowerBook. Good. Now change everything. Perfect. Now connect to your office via modem. Presto! All your calendars automatically update themselves.

Step 6: Pick up Now Up-to-Date 2.0. Or, for more info, call us at 1-800-237-3611.

Step 7: Quit goofing around reading software ads and get back to work.

You've got a lot of stuff to do.

**Now
Software**



If you think it's time your kids benefited from having a computer at home or if you already have one and want to make sure overzealous youngsters don't destroy it, read on. There's a wealth of educational software available for kids, from preschool age to college age, and there's nothing to stop parents from brushing up on a foreign language or finally figuring out physics. Here's how to pick the right computer and software for your kids.

For more information, see *Parents, Kids & Computers*, by R. Raskin and C. Ellison (New York: Random House, 1992).

By Victoria von Biel

How to Buy

A Mac for Kids

✓ If you have a home-office Mac that you also want younger children to use, you can childproof it with Apple's At Ease program (available from Apple dealers) or Kid Desk, from Edmark (206-556-8400). Each program lets you lock kids' access to important files, so there's no danger that your spreadsheets will end up in the Trash. Kid Desk also lets children set up their own customized desktop, complete with scanned-in photos and voice messages.

✓ For those who are buying a Mac for the sole use of a high-school student who will be using it only to write essays and reports, an inexpensive secondhand Mac (an SE, Plus, or Classic) is an economical idea. Otherwise, compact Macs (except for the Color Classic) are not the best choice, because they lack color, an important component of a lot of the best children's programs. An LC II or LC III, which lets you add a color monitor, may be a better choice.

✓ As Apple introduces new Mac models, discontinued models are being sold for bargain-basement prices. At press time, IIs without a monitor or a keyboard were selling for less than \$900 each — a terrific bargain.

✓ Get a big hard drive, at least 80 megabytes (bigger if you can afford it). With software now including sound, graphics, and animation, it's not uncommon to see programs as large as 10 megabytes.

✓ Get as much RAM (random-access memory) as possible — 8 megabytes is a good amount, although you'll probably be able to get by with 4 megabytes. Many educational programs use color and/or animation, which tend to eat up memory.

✓ Make sure you have sound-in capabilities, because many products now support the Mac's microphone.

✓ Consider buying a CD-ROM drive. Some of the best children's educational programs are now available on CD-ROM, including stories for prereaders, dictionaries and encyclopedias, and language-drill programs for teenagers and adults. Speed is the most important buying consideration: Go for a drive with the

highest data-throughput rate you can afford, preferably a double-speed drive. Programs can be painfully slow otherwise.

✓ If you have a modem, beware of the hype surrounding some on-line services, which advertise homework help or encyclopedic information at your kids' fingertips. Although services such as America Online, CompuServe, and Prodigy can be useful for your kids when used in moderation for specific research projects, you may find your monthly phone bill skyrocketing as your kids discover games forums and the joys of on-line, real-time conferencing.

✓ For those who do want to introduce their children to using a modem and an on-line service, both America Online and Prodigy have special children's forums.

✓ Get a printer. Although dot-matrix printers such as the ImageWriter are generally cheap, a better idea is to check out inexpensive but good-quality inkjet or bubblejet printers, which create nice-looking output. A color printer is unnecessary, although you can add a little color to an inkjet printer by using colored-ink cartridges, from Graphic Utilities (800-548-4900 or 603-532-4123). If you're buying a non-standard printer, check to see that your software supports that brand.

✓ Give younger kids a treat by replacing the standard-issue mouse with a KidzMouse, from Logitech (800-231-7717 or 510-795-8500), which looks like a real rodent (the buttons are ears, the cable is a tail) and is specially made for small hands. Adults and older kids will still want to use a normal-sized mouse or trackball; make sure you teach your kids to *always* turn the computer off before unplugging the mouse. Otherwise, they can badly damage your Mac.

✓ Don't buy a new Mac for a college-bound kid. Many schools have special computer discounts for students, so your child will probably be able to get a Mac and a printer and other peripherals at a deep discount.

✓ Keep your PowerBook for adults-only use. Portables are inappropriate for very young children and are too prone to loss, damage, or theft when used by older children. ☞

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MiniCad+4: An unsurpassed mix of ease of use and powerful features defines MiniCad+4. The award-winning MiniCad+ combines 2D CAD, true 3D CAD, a database/spreadsheet, programming language, intelligent interface and AutoCAD translator into one program. New features include 3D walkthrough and flyover tools, tolerancing, automatic roof, wall, and floor tools, and more. CAD0030 \$595

Blueprint 4*

Blueprint 4 makes drafting and design easy for architects, engineers and illustrators. The new version 4 incorporates all the professional 2D features found in MiniCad+4. The price/performance ratio is absolutely unbeatable. Try it on Manufacturer's 30 day money-back guarantee!

CAD0024 \$219*

Publisher: GraphSoft

\$219*

DayStar Universal PowerCache

DayStar has set the standard for Mac acceleration. The PowerCache is an award-winning design that gives you affordable 68030 performance and the best in compatibility. Just plug it in and go...no downtime and it works with everything. Easy installation & no additional memory required. This universal design supports fifteen different Macs & doesn't take up valuable NuBus slots. Now work up to three times faster AND the PowerCache is upgradable to DayStar's Turbo 040 accelerator.

Manufacturer: DayStar Digital
Universal PowerCache 50 w/o 68882 DR10465
Full line available.

\$769



DAYSTAR

D I G I T A L

FolderBolt

FolderBolt: If you wish to protect folders and applications from changes, copying or unauthorized use, then you need FolderBolt. It's fully integrated into the desktop and makes management of your Macintosh a breeze.

UT10212 \$75



NightWatch II*

NightWatch II: If controlling the entire hard disk is your principal concern, NightWatch II is the answer. It protects your hard

disk while you're away and prevents access and erasure via individual user preferences.

Publisher: Kent Marsh, Ltd.

Also available: FolderBolt/

NightWatch II Bundle

UT10338 \$135

\$89*



Fractal Design Sketcher™

Sketcher lets you faithfully duplicate the expressive line and texture of a soft lead pencil on rough sketch

paper—or the luminous glow of oil paints. Pencils, chalks, charcoals, calligraphy pens, spray paint and a variety of brushes for oil and water color are all available—along with a wide range of drawing surfaces. There's also photo retouching, cloning effects, type effects, "tracing paper" and more. Support's any PostScript or QuickDraw printer.

Publisher: Fractal Design Corp.

GRA0393

Also available: Fractal Design Painter 2.0 GRA0412 \$279

\$99



After Dark/More After Dark Bundle*

The Ultimate Screen Saver Collection. Over 30 displays including Flying Toasters and Fish! With sound and password protection. More After Dark—Over 25 incredible new displays for After Dark.

Publisher: Berkeley Systems

UT10231 \$45*

Star Trek™: The Screen Saver

Beam aboard the Enterprise™ with Captain Kirk and Mr. Spock on a mission to prevent screen burn-in. Encounter trilling Tribbles, Klingon battlecruisers, and burrowing horta. This all new screen saver provides over 15 animated displays, password protection, SystemIQ and full compatibility with After Dark.

UT10315 \$35

\$45*

Help! 1.05

It's the only Macintosh application which uses artificial intelligence to check your system for problems. With Help! you can clean up your configuration and improve your Macintosh's efficiency. Help! analyzes your Macintosh and creates an easily understood report that describes all problems and tells exactly how to solve them. Help! detects conflicts, incompatibilities, improperly installed files, environmental problems, damaged files, and duplicate files. Includes a simulation feature which allows you to check in advance for problems.

Publisher: Teknosys
UT10251

\$89



Infini-D 2.0

Winner of the 1992 MacUser Eddy for Best 3D Package! Infini-D 2.0 combines a friendly interface with 3D power: instant conversion of EPS files into 3D objects, awesome animation capabilities, and QuickTime support. Infini-D is the 3D package of choice for graphics and multimedia professionals.

GRA0303 \$699



BackBurner*

BackBurner is the distributed network renderer for Infini-D. Run BackBurner alone, or add an unlimited number of BackBurner Engines and watch the magic of parallel processing burn up your rendering time! Includes a FREE Engine!

\$369*

DATEBOOK AND TOUCHBASE

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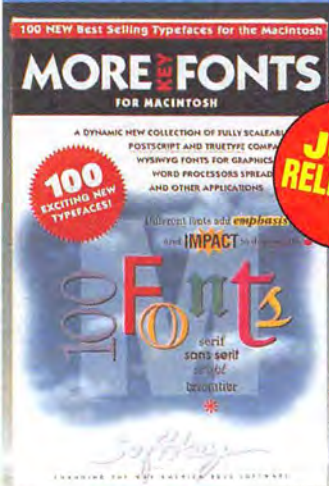
TouchBASE/DateBook Bundle

Organize your life the Macintosh way with the TouchBASE/DateBook Bundle. TouchBASE lets you store information about personal and business contacts, alternative phone numbers, plus customize the fields. Also allows you to print envelopes, mailing labels, address books, and fax cover sheets. DateBook combines a calendar, To-Do list, and alarms into one package which keeps you on top of your appointments and things to do. Icons and Banners can be placed on your calendar for graphical reminders, and To-Do's can be prioritized and automatically carried forward if not completed. TouchBASE and DateBook are both multi-user, can print in popular address book formats, and can share information to form the ultimate personal information manager. Winner, "Editor's Choice MacWorld" best Personal Information Manager. Publisher: After Hours Software BUS0253

\$99



100 Exciting New Postscript Typefaces for Mac



In More KeyFonts for Mac, Sofikey brings you 100 new choices—a mammoth selection—of exciting new typefaces.

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More KeyFonts for Mac

PRD 0013

Publisher: Sofikey

Suggested Retail: \$59.95

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BND 0185

Suggested Retail Value: \$119.98

MacWAREHOUSE Price **\$79**

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Cachet

❶ Cachet, Editor's Choice for "Software Product of the Year" *MacUser*, lets you edit desktop color images in a remarkably intuitive and accurate way by using your own eyes! With Cachet's unique Edit-by-Reference feature, you'll never make another printing mistake because you adjust the on-screen colors of your image to match a reference image that has already been printed. Other features include MultiChoice, a quick way to correct color. EfiColor for matching color to any printer and more! Publisher: EFI GRA0432



\$399

IntelliDraw

❶ Aldus IntelliDraw defines an exciting new category of drawing program, with intelligent features that give you an easy new way to draw, refine and visually experiment with your ideas. Innovative smart tools link graphics in your drawing so they respond to changes automatically. Create visual "what-if" scenarios with features like intelligent clip art & templates, automatic symmetrical objects, and dimensions lines. Auto-alignment, shape blending, powerful text handling capabilities, unlimited layers, color



gradients, standard draw tools and more. Publisher: Aldus GRA0354 Also available: IntelliDraw Competitive Upgrade SID0028 \$99

\$199

Capitalist Pig



❶ New! Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, terrorists, and more, as you battle for billions—or bankruptcy. Make crucial business decisions every minute, and enjoy the results—or suffer the consequences.

Packed with sound animation, and fun, it draws rave reviews from would-be entrepreneurs of all ages. Capitalist Pig is the must-have "Game of the Year". You never knew business could be so stimulating! Publisher: Pluma Software ENT0447

\$35



DiskExpress II

Your Network Is Under Arrest!

❶ Slow hard drives spell trouble for networks of all sizes. Free your network by running DiskExpress II, the only true network optimizing software for the Macintosh. Fully AppleShare and FileShare compatible. LAN managers will love its sophisticated yet easy-to-use features, that allow for transparent operation without down time! Manage free disk space for large graphic files, and multimedia applications where contiguous space is a must. Works equally well on stand alone systems. Single user version. UT10132 \$49 Publisher: ALSoft, Inc. Also available: Power Utilities UT10269 \$65 and Master Juggler UT10244 \$25.

\$49

Times Two

❶ Times Two is an easy, one-time installation that expands your disk to twice its size in minutes. Your PowerBook's 40 MB becomes 80 MB instantly. Your Iliac's 80 MB disk swells to 160 MB. Without ever opening your Mac or installing expensive hardware, you can expand your disk space in minutes. *MacUser* Editor's Choice Award Finalist! Publisher: Golden Triangle UT10343 Also available: Times Two 800K UT10344 \$109



\$109

Virtus WalkThrough 1.11

❶ The latest version of the award winning 3-D drawing program provides everything you need to quickly capture and explore your ideas in 3-D. Multiple windows and extensive drawing aids provide an interactive environment for editing and viewing your ideas. Interactive 3-D presentations, QuickTime® and PICS animated movies and perspective pictures dazzle your audiences. Enhanced Imports of 3-D DXF, Claris® CAD and MacDraw, PICT and EPS. Winner of "Breakthrough Product of the Year" Award 1990-*MacUser*. Publisher: Virtus Corporation GRA0278



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WRD0057 ExpertWriter	29
Teleware, Inc.	
FIN0087 M.Y.O.B. 3.0	109
Timaker Co.	
WRD0060 WriteNow Workshop	85
WordPerfect Corporation	
WRD0041 WordPerfect 2.1	289

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COM0131 AppleTalk Remote Access	159
COM0126 Macintosh PC Exchange	69
Dayna Communications, Inc.	
NET0125 DaynaPORT E/Z	269
NET0076 DaynaPORT E/SE	149

Sounds

Instant relief from the work-place. Let Sounds transport you to an Amazon rainforest, a South Pacific island, or a country farm. Sounds creates fantasy environments of sound while you work on your Mac. Sounds' colorful, picture filled interface lets you customize any of 11 exciting environments.

Publisher: Digital Eclipse

UTI0359

\$39

Farallon Computing

NET0007 PhoneNET Plus, SE & II	31
NET0019 PhoneNET Star Controller	899
NET0329 Timbuktu 3.0	139
NET0034 Timbuktu/Remote 3.0	129
Global Village (full line available)	
PowerPorts	Call

Public Utilities

Public Utilities automatically examines your hard disk while you work. It checks for common problems (bad sectors, corrupted data, and damaged directories) and alerts you when it finds them. It also suggests how to fix the problem (or at your option, corrects problems automatically).

Manufacturer: Fifth Generation

UTI0325

\$99



Hayes	
MOD0065 Bundle 9600 ULTRASmartModem	679
MOD0077 OPTIMA 96 for the Mac	399
MOD0096 OPTIMA 24 Bundle	145
Insipia (Full line available)	
UTI0174 AccessPC 2.0	60
COM0144 Soft PC Universal 3.0	195
PowerUser	
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MOD0085 Ultimate Home Office 24/96	489
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NET0133 GracELAN 2.0 50-user	279
White Pine Software	
COM0143 Mac 320-VT320 Emulator 1.1	95

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GRA0371 Adobe Premiere 2.0	429
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GRA0383 addDepth	125
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FON0480 KeyFonts	49
Softronic Publishing	
GRA0366 Expert Home Design	29

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CoStar	
INP0196 AddressWriter Envelope Printer	479
Datadesk International	
INP0174 Mac 101E Keyboard Platinum	129
INP0183 Mac 101E w/Keys 2	159
Kensington	
INP0231 Turbo Mouse (SE or II) 4.0	109
Microtek	
INP0246 Microtek ScanMaker II	929
INP0247 ScanMaker II XE	1239
Mouse Systems	
INP0132 Little Mouse ADB	74
INP0232 PowerPad	79
SuperMac	
MON0224 20" SuperMatch Color Display	1599

UnMouse

The UnMouse is an intuitive touch tablet. Move the cursor effortlessly. Just slide your finger over the glass, then press to click.



Plus it comes with special templates, each offering up to 60 programmable functions.

keys. And it even works with a stylus.

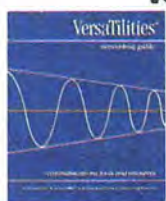
Manufacturer: MicroTouch INP0084

\$145

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AC0834 Battery Charger	109
Battery Technology Inc.	
AC0840 Battery for Powerbook	69
CMG Computer Products	
AC0837 Powerlock for Powerbooks	49
Connectix	
UTI0297 CPU Connectix for Powerbook Utilities	49
Kensington	
INP0221 Notebook Keypad	79

VersaTilities



VersaTilities provides a suite of tools for use with Apple CommToolbox and MacTCP applications. VersaTilities' tools provide support for

Telnet and FTP (Client/Server) on LocalTalk, Ethernet and Serial (via SLIP) networks. VersaTilities' SLIP support enables Mac users to remotely access the Internet by dialing into a SLIP server. Publisher: Synergy

COM0140

\$59

No Hands Software

UTI0313 Magnet	89
Sophisticated Circuits	
INP0232 Powerpad	79

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DR0253 DataPak 45MB Removable	549
Peripheral Land, Inc.	
DR0375 Infinity 88 Removable single	649
DR0115 Infinity Turbo 40 Meg Removable	579
PowerUser	
CHP0011 4 Meg SIMMs 80ns	199
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DR0533 20 Meg External Hard Drive	299
DR0530 80 Meg Drive	439
DR0494 Pro 105 MB Drive/Quantum LPS)	499
DR0546 Pro 210 MB Maxtor Drive	749
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DR0437 Spectrum/8.24 PDD	899
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UTI0179 DiskDoubler 3.7	49
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UTI0337 Snooper Kit 2.0 w/Free Virex	179
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Symantec Corporation	
UTI0151 Norton Utilities for the Mac 2.0	95
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- Connecticut, New Jersey and Ohio residents add appropriate sales tax.
- Orders for in-stock items placed by 12:00 midnight (E) weekdays, (barring system failure, etc.) ship overnight by Airborne Express (Some areas require an extra day).
- Shipping charge \$7 per order up to 7 lbs. \$1 per lb. above 7 lbs.
- UPS ground service also available upon request - \$3 per order.
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- Alaska, Hawaii, outside continental U.S., APO/FPO call for information.
- Item availability and price subject to change without notice.
- Software is not copy protected, except where marked by asterisk.
- We reserve the right to limit quantities.
- Please indicate disk size.

\$119



Final word: The tool bar in version 5.1 of Microsoft Word is pretty nice, but if you really want to be impressed, check out Alki's MasterWord (\$99.95). This utility program is designed to enhance Word and comes with a plug-in

 tool-bar module that offers 11 preconfigured bars, including one, called Frequent, that **monitors your activity** and automatically sets up a tool bar based on the commands you use most often. Now that's what we call service. Also included is Alki Seek, an excellent find-file DA that includes text search. You can buy Alki Seek as a stand-alone product for \$39.95, and you can use it with any program, not just Word. 800-669-9673 or 206-286-2600.

Power utilities: There's a new compression contender in town: Now Software's Now Compress, a file-level compression and archiving program (like StuffIt and DiskDoubler) that includes idle-time compression (that is, it can compress files when you're not using your Mac). 800-237-3611 or 503-274-2800. \$99 and up, depending on configuration. ♦ Are your extensions and control panels feuding? **Diagnose software ailments** with Alert!, from Maxa (maker of the hardware-diagnostic tool Snooper). Alert! (which also works

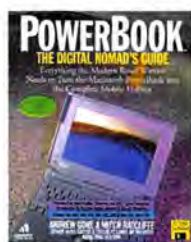


across a network) reports software conflicts and lets you turn off dueling extensions and control panels. It also warns you about such things as outdated versions of software and problems caused by low memory or insufficient free disk space. Alert! works from a database of reported conflicts that is available for no charge from on-line services. 800-788-6292 or 818-543-1300. \$229.

Off-the-shelf support: Hewlett-Packard has put three-year service contracts for its printers into shrink-wrapped boxes and is selling them off the shelf wherever its products are sold. Pick up the HP SupportPack when you buy your printer (the price is based on a percentage of the printer's cost), and you'll get an instruction letter, a registration card, and a nonremovable label for your printer. The SupportPack guarantees users that if a problem can't be fixed over the phone, a replacement printer will be shipped for next-day delivery. 800-752-0900 or 208-323-2551. ♦ If your laser printer is leaving streaks and spots on your output, dirty corona wires are probably to blame. The LaserKleen pen (\$3.95) provides an easy way to **clean the wires**, and you can also use it to clean print heads and rollers on fax machines and dot-matrix printers. To purchase one, contact Paper Direct at 800-272-7377 or 201-507-1996.



Power books: Going on the road with your PowerBook? Make sure you remember to pack a copy of *PowerBook: The Digital Nomad's Guide* (by MacWEEK editors Andrew Gore and Mitch Ratcliffe, published by Random House Electronic Publishing) along with your extra batteries. This book covers such topics as PowerBook connectivity, **battery conservation**, and roadproofing your PowerBook. 212-751-2600. \$24. ♦ Finally, a book that explains virtual reality and describes how we



will be using it in the next few years. *Silicon Mirage: The Art and Science of Virtual Reality*, by Steve Aukstakalnis and David Blatner, is published by Peachpit Press. 800-283-9444 or 510-548-4393. \$15. ♦

By Victoria von Biel

Upgrades the Apple Way

By Tom Petaccia

This article is for folks who feel safer if everything inside their Mac has an Apple label — including upgrades. The advantage of this thinking is that you can buy everything from your local Apple dealer, and you have only one person to yell at if something goes wrong. There's also the theory that because everything is

from Apple, it will work together in perfect harmony.

Then, there are some upgrades that only Apple supplies. They are logic-board upgrades, which turn one Mac into another — Classic to Classic II or IIci to Quadra 700, for example. Sometimes the upgrade includes items such as microphones and

RAM in addition to the logic board itself. Ask your dealer about what is included with a particular logic-board upgrade.

Apple upgrades have some disadvantages. Among them are

- You'll probably pay a lot more for items than you would if you bought them elsewhere. Even though Apple has made



AVAILABLE TODAY:

Mac model	Maximum RAM*	Maximum VRAM	FDHD (SuperDrive)	Logic board	Internal modem	Ethernet card†
Plus	4 MB	NA	NA	NA	NA	NA
SE	4 MB	NA	\$385	SE/30 [§]	NA	NA
SE/30	128 MB	NA	NA	NA	NA	NA
Classic	4 MB	NA	NA	Classic II, \$629	NA	NA
Classic II/Performa 200	10 MB	NA	NA	NA	NA	NA
LC	10 MB	1 MB (512K VRAM Expansion Kit, \$159)	NA	LC II, \$719; LC III, \$599	NA	Ethernet LC Card, \$165
LC II/Performa 400	10 MB	1 MB (512K VRAM Expansion Kit, \$159)	NA	LC III, \$599	NA	Ethernet LC Card, \$165
II	128 MB	NA	\$385	IIx, \$2,319	NA	Ethernet NB Card, \$349
IIx	128 MB	NA	NA	IIx, \$2,319	NA	Ethernet NB Card, \$349
IIcx	128 MB	NA	NA	IIci, \$1,339; [§] Quadra 700, \$3,129	NA	Ethernet NB Card, \$349
IIsi	65 MB	NA	NA	NA	NA	Ethernet NB Card, \$349
IIci	128 MB	NA	NA	Quadra 700, \$3,129	NA	Ethernet NB Card, \$349
IIfx	128 MB	NA	NA	NA	NA	Ethernet NB Card, \$349
IIvx	68 MB	1 MB (VRAM Expansion Kit, \$159)	NA	Centris 650, \$1,599	NA	Ethernet NB Card, \$349



great strides in "competitive pricing" over the past year, most third-party prices are significantly lower. (Note that the prices we've quoted for logic-board upgrades assume that you have traded in your old board for the new one. According to Apple, the logic-board chips are proprietary software that must be returned.)

• Your options are extremely limited. For some Mac models, such as the Plus, the Classic II, and the Performa 200, the only thing you can do is upgrade the RAM. Apple doesn't provide every possible upgrade, either. For example, it offers a limited set of RAM upgrades, none of which can take most Macs to their

maximum possible RAM configuration. Also, at press time, Apple was offering only one video-display card, the 8•24, which is severely limited. In these instances, you may as well look at third-party alternatives. Although it is technically feasible to stay with Apple for these items, it may not be practical.

The following chart shows you what Apple upgrades are possible for most Mac models. Some network upgrades are also available; your Apple dealer can fill you in on those products.

Tom Petaccia is an independent Mac consultant based in Charlotte, North Carolina.

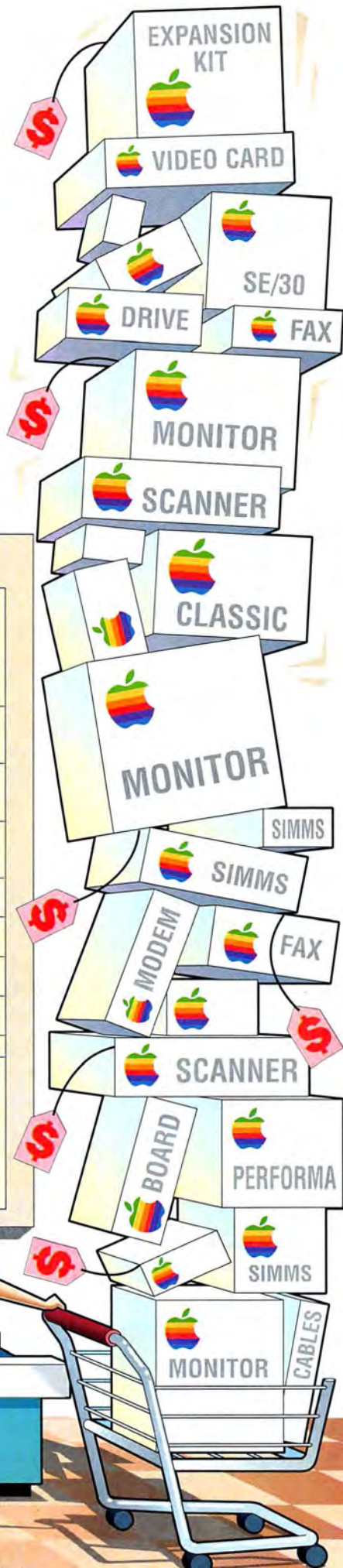
Mac model	Maximum RAM*	Maximum VRAM	FDHD (SuperDrive)	Logic board	Internal modem	Ethernet card [†]
Performa 600/600 CD	68 MB	1 MB (VRAM Expansion Kit, \$159)	NA	NA	NA	Ethernet NB Card, \$349
Quadra 700	68 MB	2 MB (3 VRAM Expansion Kits, \$159 each)	NA	NA	NA	NA
Quadra 900	256 MB	2 MB (2 VRAM Expansion Kits, \$159 each)	NA	Quadra 950, \$2,679	NA	NA
Quadra 950	256 MB	2 MB (2 VRAM Expansion Kits, \$159 each)	NA	NA	NA	NA
PowerBook 100/140/145	8 MB	NA	NA	NA	Internal Fax/Data, \$225	NA
PowerBook 160	14 MB	NA	NA	NA	Internal Fax/Data, \$225; Express, \$319	NA
PowerBook 170	8 MB	NA	NA	NA	Internal Fax/Data, \$225	NA
PowerBook 180	16 MB	NA	NA	NA	Internal Fax/Data, \$225; Express, \$319	NA
PowerBook Duo 210/230	24 MB	NA	NA	NA	Express, \$319	NA
Duo Dock	NA	1 MB (512K VRAM Expansion Kit, \$99)	NA	NA	NA	NA

All prices are from the February 10, 1993, Apple Suggested Retail Price List — the most current at press time.

*Apple does not offer all the requisite RAM-upgrade kits to bring most Macs to their maximum-RAM configuration.

[†] Ethernet cards also require a Twisted Pair (\$145) or Thin Coax (\$145) Transceiver.

[‡] No longer on the price list but may still be available from authorized Apple dealers that have not returned old inventory. Information shown here is for reference only.



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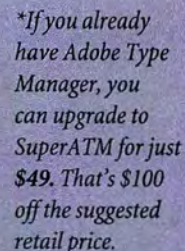
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Expert Installations



Throw out Apple's wimpy DAs, and replace them with powerful third-party utilities that really get you working.

By Adam C. Engst

Apple's system-software Installer ranks only slightly above the average eight-year-old in terms of cleanliness. The Easy Install option installs everything you might want but gives no thought to what you *don't* want. The Customize option gives you some control over what gets put onto your hard disk, but even a custom installation burdens you with all the DAs and control panels that Apple includes with system software, whether or not you want them, so you're still left with a System Folder cluttered with useless files. I am referring, of course, to such DA dinosaurs as the Alarm Clock, Calculator, Note Pad, and Puzzle. Unless you're one of the few people who actually finds these programs useful, I recommend that you replace them with third-party utilities. I'll describe some of the best (many of them are free or available for a minimal charge), but let's talk first about how to install system software.

Beyond the Installer

Sure, you can reduce System Folder clutter somewhat by clicking on the Customize button in the Installer's main screen and selecting specific items (avoiding the ever-useless LQ AppleTalk ImageWriter driver), but as I said, even customized installs leave debris behind. If you have a complex System Folder, you'd be better off using Easy Install, which gives you a generic, Apple-approved System Folder, and then weeding out unneeded files. If you know exactly what you

don't need in your System Folder, cleaning up after an Easy Install is pretty straightforward. (If you need help weeding out the useful from the useless, see "Managing Mystery Files," March '93, page 224.)

The problem with the Customize option is that it provides a long, confusing list of choices, including separate selection choices for most Macs plus one for "System Software for Any Macintosh." As a general rule, you should opt for System Software for Any Macintosh, just to be safe; if you install a system for the aged Plus on an external hard disk, for example, that disk probably won't boot the latest Quadra. This may seem an unlikely situation to find yourself in, but I once needed to boot an SE with the SyQuest backup of my boot partition. Had I installed the system software for my SE/30 on the SyQuest cartridge rather than choosing System Software for Any Macintosh, my backup might not have booted the SE. Also, if you buy a new Mac or are trying to recover files, you may need to use your internal hard drive in another Mac — not a time when you want to deal with crashes.

Below the specific installation scripts in the Customize dialog box, you'll see "minimum"-install scripts that install nothing more than a stripped-down system and Finder. Don't mess with these unless you are creating an emergency boot floppy disk.

There are only two good reasons for installing over an existing system: You're upgrading, or you suspect that your

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POWER TOOLS

BEATING THE SYSTEM

current system is corrupted. Either way, drag your current System file to the desktop *before* rebooting with the Install 1 floppy disk. This ensures that no virus-protection software can corrupt the install, and the Installer will give you a factory-issue System file you can customize manually with resources such as fonts, sounds, and keyboard layouts. Apple's Installer does not replace customized resources, however, which means that it may fail to replace a corrupted resource (because corruption might make that resource appear to be customized). Thus, if you have customized resources and you're using the Installer to clean up a corrupted System Folder, you may end up with an equally corrupted System file after you install.

There is a way to avoid using the Installer altogether, however. Immediately after you finish customizing a new System Folder, make two backups. First, manually back up your System and Finder files to a floppy disk (if you compress them, use a self-extracting archive to allow for emergency access). Second, separately back up your entire System Folder so that you can easily replace any extensions that later become corrupted. *Do not* update this System Folder backup, or you risk passing on corruption to the backup files. Store these two backups somewhere safe, and instead of mucking around with Apple's overzealous Installer when you suspect corruption, just restore individual files from your backup disk. And, of course, back up your entire disk regularly to protect yourself from serious problems.

Desk-Accessorizing

Now that you've got a clean System Folder and backups of your important files, let's look at some of the weaker DAs that the Apple Installer stuffs into your Mac and what you can replace them with. Several of these products are available as freeware or shareware (meaning you pay a paltry sum directly to the developer if you like the product); you can get these programs from user groups or on-line services such as America Online, CompuServe, or MacUser's own ZiffNet/Mac. I've given the filename and library number for files available from ZiffNet/Mac's Download & Support Forum.

Alarm Clock. Alarm Clock is a sorry excuse for a clock. It also manages to duck behind any other window open on your desktop. If you don't mind that, you

can find several better DA clocks that have pictures of models and celebrities such as Opus, from "Bloom County." I prefer the free SuperClock menu-bar extension (SUPERC.SIT, Library 3), which displays the time and the date and includes a stopwatch that's handy for monitoring on-line time. It also has a PowerBook-battery indicator that beats Apple's Battery DA. First Things First (\$79.95), from Visionary Software (503-246-6200), is a simple appointment book with a handy clock tile that either floats free or docks in the menu bar, where nothing ever covers it. A free demo version provides only the clock and five optionally repeating reminders; the commercial version adds unlimited reminders and printing capabilities. Of course, you can also replace Alarm Clock with a \$2 stick-on clock from your local hardware store that uses no memory, wastes no screen space, and doesn't conflict with that neat extension that makes your cursor simulate a Mexican jumping bean.

Calculator. Apple's calculator is no big deal, although it can add 2 + 2 and get 4.00000000000000, courtesy of Apple's hyperaccurate SANE (standard Apple numeric environment). Several freeware and shareware calculators offer additional features such as printing, simulated paper tape, reverse Polish notation (for people accustomed to Hewlett-Packard calculators), and the sort of financial functions that led to Michael Milken's incarceration. I use an old program called Calculator+, which offers scientific and financial functions, a printable tape, and 14 digits of π . I couldn't track down a copy of Calculator+, and if you can't find it either, try the shareware Calculator II (CALCII.CPT, Library 1). The commercial Calc+ (\$79), from Abbott Systems (914-747-3116), has garnered many friends with its ability to work with and quickly convert DTP measurements to units such as points, picas, and cicerons. (Of course, if you don't need to cut and paste from your calculator to other programs, you can always use a \$5 solar-powered calculator, available from your favorite electronics vendor.)

Key Caps. When you have a yen to type the British pound symbol (or the Japanese yen symbol, for that matter), you have to go to the Apple menu, open Key Caps, scan the Key Caps keyboard display, hold down a modifier key, and hunt through the assembled characters for the one you need. This is a pain,

especially if the character you want, like the rabbit dingbat, doesn't exist in all fonts or sizes. More helpful is Gunther Blaschek's free PopChar extension (POPCHA.SIT, Library 3), which displays all the characters in the current font when you click on a user-defined corner of the screen. PopChar displays the key combination necessary to type the selected character and can also insert the character into your document. The KeyFinder DA, in Symantec's Norton Utilities for Macintosh, shows all of a font's characters in one window as well, and because it's nonmodal (you can keep your window open in the background), it's good for browsing. Nisus, Word 5.0 and 5.1, and WordPerfect each feature similar capabilities.

Note Pad. Note Pad is a powerless joke of a DA that no one has used since late 1984. I think the only enhancement Apple has added to it since then is a color icon for System 7. And yet, the idea of a notepad is attractive. Many people replace Note Pad with a text-editing DA such as Vantage (\$99.95), from Baseline (800-926-9677 or 901-682-9676), or the shareware products miniWriter (MINIWR.SIT, Library 2) and McSink (MCSINK.SIT, Library 2). For instant access to your notes, try a QuickKeys Display extension or Andrew Welch's shareware FlashWrite II. At the stroke of a key, each DA pops up a text-entry window that appears immediately with your notes.

For the next step up in power and complexity, try ThoughtPattern (\$149), from Bananafish Software (415-929-8135). It's a useful program that's great for storing text records. You can quickly categorize these records with keywords and retrieve them with keyword or free-text searches. Also interesting is Spiral (\$129), from Technology Works (800-688-7466 or 512-794-8533), a free-form note-taking program designed primarily for use with PowerBooks. Spiral includes cleverly implemented features such as bookmarks, text links, and simple calculations and allows you to devote pages and sections to different topics and easily flip among them.

Puzzle. If you think Puzzle is neat already, try pasting a new PICT into it (just use the Finder's Cut and Paste commands). Or for a change, replace Puzzle with a quickly accessible game such as the DA version of Tetris (\$39.95), from Spectrum HoloByte (510-522-3584), or

Ben Haller's punishingly addictive Lunatic Fringe, an After Dark module from the screen saver More After Dark (\$39.95), from Berkeley Systems (510-540-5535). Of course, because you can put any game (or an alias of one) onto your Apple menu, quick games such as the shareware solitaire game Klondike (KLONDI.SIT, Library 1) are always appropriate.

Scrapbook. Apple's Scrapbook works fine, but it pales in comparison with SmartScrap II (\$89.95), from Portfolio Systems (800-729-3966 or 408-252-0420), which manages multiple scrapbooks, allowing you to name and search for individual pages in them, and Now Scrapbook (part of Now Utilities [\$149], from Now Software [800-237-3611 or 503-274-2800]), which holds sounds, text, QuickTime movies, and various types of graphics and provides elegant list and thumbnail views. Now Scrapbook lets you name and sort items, store keywords, and search for text within its catalog. It includes Clipboard Editor, with which you can modify text and graphics and even import and export files. The ultimate in scrapbook-type utilities is Fetch (\$295), from Aldus (800-333-2538 or 206-628-2320), which stores pointers to images, sounds, and movies — even those on unmounted CD-ROMs. Fetch excels at handling thousands of large items but will earn its keep with even a few hundred.

Out-of-Control Panels

Once you've replaced Apple's least impressive DAs, you can go ahead and customize control panels as well. For additional control of File Sharing and reporting on its usage, try Nok Nok (\$49.95), from Trik (800-466-8745 or 617-933-8810), or Robert Hess' free ShowShare (SSHARE.CPT, Library 1). And to switch your monitor's bit depth more easily than you can with the Monitors control panel, try the freeware FKey Switch-A-Roo (SWTCHR.SIT, Library 3) or the shareware control panel Depth-Gauge (DGAUGE.CPT, Library 3) or PixelFlipper (PXFLIP.SIT, Library 3). The bottom line is to try to find DAs and control panels you'll actually use. Remember, just because Apple installs something, you don't have to use it. ☐

Adam C. Engst is the editor of the on-line magazine TidBITS. You can reach him on CompuServe at 72511.306.

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If you're the owner of an original vintage PowerBook 100 (now discontinued by Apple), perhaps you're wondering if you should sell it or upgrade it. You'll probably choose to hang on to it — very few PowerBook 100 models appear in the used market, because owners value them highly and simply don't want to part with them. Whether you bought your PowerBook 100 for \$699 at Price Club or paid more than \$2,000 for it when it was first released, you've got a sturdy and very useful machine that's perfect for single-application use.

By Bob Brant

Upgrading the PowerBook 100

Every PowerBook 100 owner needs two essential items: an Apple HDI-30 **SCSI Disk Adapter Cable** (\$49), which lets your PowerBook 100 appear as a hard-disk icon on the desktop of any other Mac to which it's connected, and an Apple HDI-20 external 1.4-megabyte **floppy drive** (\$279), which lets you put data onto floppy disks. If you don't already have these two items, you can get them from your Apple dealer.

Next, **upgrade the memory**. A PowerBook 100 with 2 megabytes of RAM restricts you to using a single application — a minimum configuration of Microsoft Word or WordPerfect, for example — under System 7. With 4 megabytes of RAM, you can have more than one application open, and if you expand to the 100's 8-megabyte limit, you have even more power. PowerBook 100 memory upgrades come in 2- and 4-megabyte configurations from Apple and third-party vendors (check the back of this and other Mac magazines for memory vendors) and 6-megabyte configurations from third-party vendors and cost \$90 to \$270, depending on the configuration.

Also consider adding a **larger hard drive**, such as the internal Quantum Go•Drive 80 (\$349), from Alliance Peripheral Systems (29 S. 291 Highway, Independence, MO 64057; 800-645-5401 or 816-478-8300). Alliance reports that most buyers opt for the 80-megabyte internal drive, but the internal Go•Drive 120 (\$469) is rapidly gaining popularity. You can

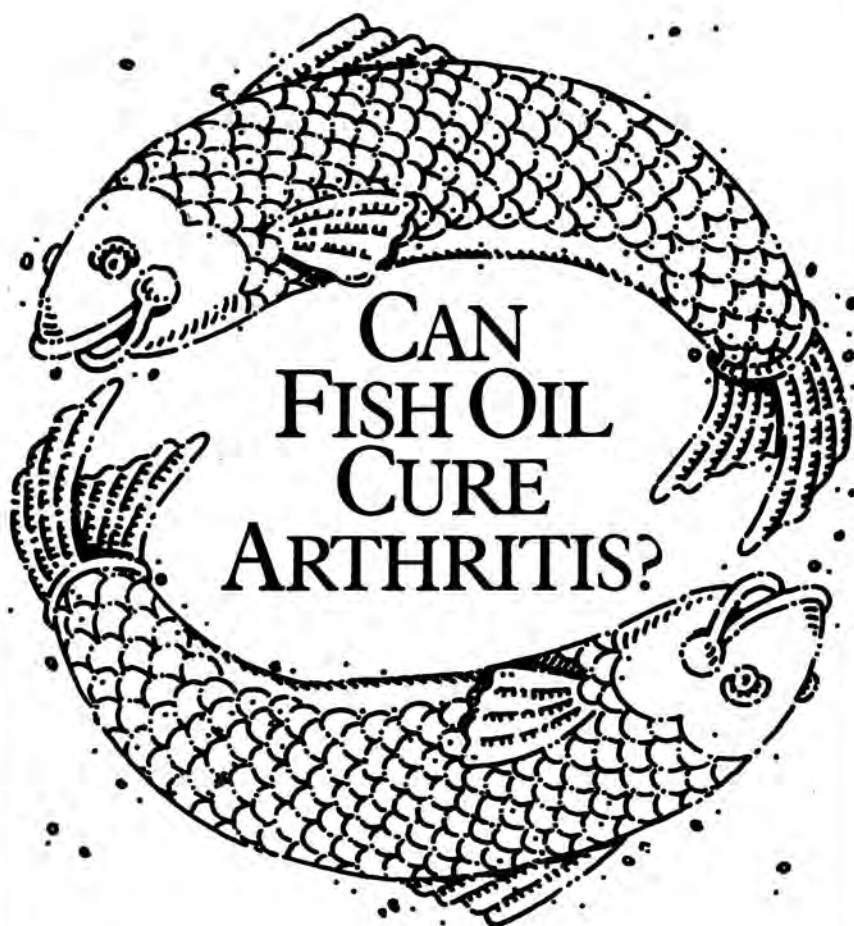
put your old drive into Alliance's companion external battery-powered case.

The ability to hook your PowerBook up to an **external monitor** is a good option if you'll be using your notebook computer in the office as well as on the road. Internal video adapters are no longer made, now that Apple has discontinued the PowerBook 100, but you can have color video on your desk via your PowerBook 100's SCSI port by using the ScuzzyVIEW (\$395), from Aura Systems (P.O. Box 4576, Carlsbad, CA 92008; 800-365-2872 or 619-438-7730). This 1.5-pound, 2-x-4-x-6-inch unit can not only drive a monochrome monitor as large as 19 inches but it can also give you 4-bit color (an unadvertised feature) on color monitors. The 8-bit model (\$545) comes with ScuzzySHOW software, which lets you show 256-color slides. Just add the color monitor of your choice. If monochrome video is OK or if you prefer to have a full-page portrait monitor complete with a monochrome SCSI video adapter, the Sigma Power Portrait (\$995), from Sigma Designs (47900 Bayside Parkway, Fremont, CA 94538; 800-845-8086 or 510-770-0100), is the way to go.

If you're a frequent traveler, a must-have upgrade is a **modem**. Although you might be happy with one of the numerous internal 2,400-bps-modem/9,600-bps-fax combos that cost around \$199, a better bet is the PowerPort/Gold, from Global Village Communication (685 E. Middlefield Road, Mountain View, CA

Table 1: Recommended Upgrades for the PowerBook 100

Upgrade	Pros	Cons	Cost
HDI-30 SCSI Cable	Fast transfers.	None.	\$50
External floppy drive	Convenient.	Cost.	\$280
2 MB of RAM (4 MB total)	More than one application open at once.	None.	\$90 and up
80-MB internal hard drive	Speed; more storage.	Cost.	\$350 and up
Color SCSI video	Able to use external color monitor.	Need external monitor.	\$395 and up
Fax modem	Better communications.	Cost; need telecom software.	\$200 and up
Utility package	Better power management.		\$99 and up
Total upgrade price			\$1,365
List price of new PowerBook 145 4/40			\$2,000 + \$200 modem



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94043; 415-390-8200), or the Power-Modem IV, from PSI Integration (851 E. Hamilton Street, #200, Campbell, CA 95008; 800-622-1722 or 408-559-8544). Priced at around \$429, each product features 14,400-bps-modem and 9,600-bps-fax capabilities.

Because battery issues affect every PowerBook user, a **second battery** (\$99 from your Apple dealer) is always a good investment. The PowerBook 100 Battery Recharger PB-100 (\$129), from Lind Electronic Design (6414 Cambridge Street, Minneapolis, MN 55426; 800-659-5956 or 612-927-6303), lets you run your PowerBook 100 from one battery while you recharge a second. It comes with its own AC adapter. If you plan to do extended portable computing, you might find Lind's Auxiliary Power Pack (\$189) handy. It emulates Apple's AC Adapter — without having to be plugged in to AC — letting your PowerBook run as much as four times longer than it does off the internal battery alone, and it charges your PowerBook's internal battery while you work. The Auxiliary Power Pack can be recharged from a 12-volt DC or 115-volt AC source. If you spend a lot of time in your car, you might want to check out Lind's Automobile Power Adapter (\$99), which plugs in to a car's cigarette lighter and provides a regulated voltage source for a PowerBook while it charges the internal battery.

For even better battery management, try a **PowerBook utility collection**, such as CPU (\$99), from Connectix (2655 Campus Drive, San Mateo, CA 94403; 800-950-5880 or 415-571-5100), or Norton Essentials for PowerBook (\$129), from Symantec (10201 Torre Avenue, Cupertino, CA 95014; 800-441-7234 or 408-252-3570). Each product offers such battery-conservation features as battery status, screen dim, disk spindown, and CPU shutdown and sleep as well as other useful features such as more-visible cursors and simple security controls. Both CPU and NEP give you file synchronization, which lets you update files on your desktop Macintosh and on your PowerBook. ☐

Bob Brant is a Mac consultant and the author of *Upgrade Your Macintosh and Save a Bundle*.

FIND THE PROBLEM



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```

10 REM *****
20 OPEN "dev1" FOR OUTPUT AS #1
40 OPEN "dev1" FOR INPUT AS #2
50 REM *****
60 PRINT #1,"Clear 1"
70 PRINT #1,"local lockout"
80 PRINT #1,"Output 1:dat gml: ufn? yml:"
90 REM *****
100 PRINT #1,"trigger 1"
110 PRINT #1,"Enter 1"
120 INPUT #2,AS B5
130 REM *****
140 PRINT #1,"output 1:dat mcd:asc:correl"
150 PRINT #1,"Enter 1"
160 INPUT #2,AS B5
170 REM *****
180 PRINT #1,"poll 1"
190 INPUT #2,SPB5

```

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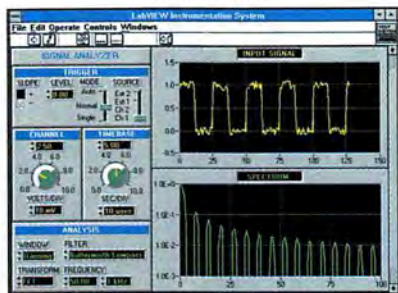
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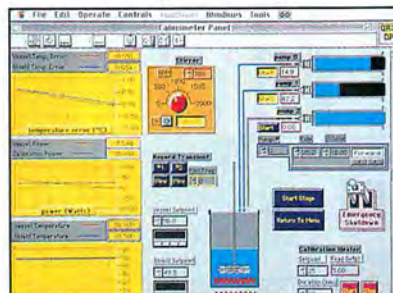
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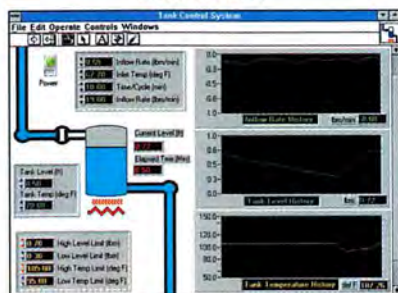
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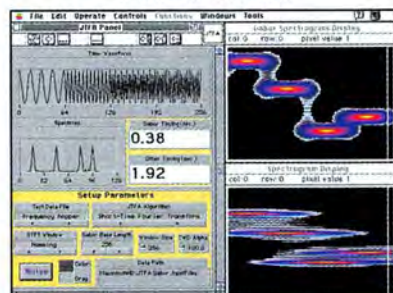
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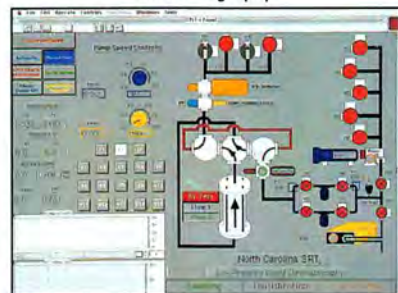
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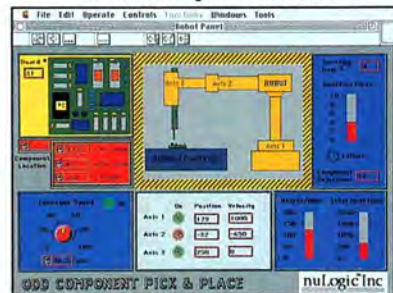
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CIRCLE 177 ON READER SERVICE CARD.



TIP SHEET

Nobody ever said you had to live in Cupertino to be a Macintosh expert. Know-it-alls are everywhere, from Manhattan to Malibu — even in Waldport, Oregon, where we found our own Mac guru, Philip Russell. Each month Phil shares his own tips plus the best from the 70-odd Macintosh-user-group (MUG) magazines he reads each month. But Phil can't do it alone. To those whose undocumented Mac tip *MacUser* prints, we pay \$25, and the Reader Tip of the Month earns \$100.



Send your tip, together with your name,

address, and phone number, to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically via



ZiffNet/Mac, the on-line service for *MacUser*. Send them to

Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

By Philip Russell

Reader tips compiled by Gregory Wasson

■ If you're a Mac user, you should belong to a Macintosh users group (MUG). To locate a nearby MUG, call Apple at 800-538-9696, ext. 500.

■ Which fonts are easiest to read, serif or sans serif? Most people find serif much easier to read for body text; either serif or sans serif works for headlines. Avoid using all caps, all italics, or all cursive fonts for body text.

■ What's the first thing to do when you're trying to perform an operation and you get an "almost out of memory" message? First, highlight a single character — any character — and copy it. Now select another single character and copy it. Why repeat this? The first character you copied replaced the large item you probably had on the Clipboard. But the replaced item was still being held in a buffer; that's how you're able to undo the most recent Copy command. The second time you copy a single character, the buffer lets go of your original big Clipboard item and replaces it with the single character you initially copied to the Clipboard. You now have about as small a Clipboard as possible. This maneuver reduces to a minimum the memory being used for the buffer

and the Clipboard. You may now be able to complete your original operation.

■ If you have an ImageWriter and haven't solved the first-page-jam problem, here's one solution: Leave the paper hanging in the tractor-feed section of the printer (before it enters the roller). After you've turned on the ImageWriter, press the form-feed button, and you are off and running with no problems. Paper curl causes most jams, and if the paper isn't left rolled partway around the roller, it won't curl.

■ If you print on a LaserWriter, be sure the Symbol font is installed, even if you never use it. Why? Symbol provides information that many downloadable LaserWriter fonts use to print out special characters.

■ Do you use the keyboard equivalents in Word 3.0 and up? For example, to delete the previous word, use Option-Command-Delete. Substitute G for the Delete, and you delete the next word instead.

■ Many Mac serial numbers are on a bar-coded label that a thief could easily peel off. For greater security, engrave your driver's license number on the bottom of the case with an engraving tool. If you open your Mac, put a sticker with

the serial number on it inside the case or engrave the number on the bottom of the case. The serial number helps identify the computer; the driver's license number helps the police find you to give it back. (Thanks, Tropical Mac, Gold Coast MUG, Miami, Florida.) ■ Here's a reminder: In standard Open and Save dialog boxes, Command-down arrow opens a selected folder; Return or Enter equals Open or Save.

■ In PageMaker, you have a dot leader for a tab, but it reflects the font, style, and size of the preceding text, not the text following it. To change the dot leader, place your cursor after the last character before the tab leader. Specify the font, size, and style of the tabbed material. Press Option-space bar. This locks in that font, size, and style, and the leader changes accordingly.

■ To place tabs more precisely than $\frac{1}{16}$ inch in Word, change inches in the Preferences menu to points. Now you can adjust tabs to 1-point ($\frac{1}{72}$ -inch) precision.

■ When writing *go to card* scripts in HyperCard, the card ID number is foolproof. However, naming the card intuitively helps you make sense of scripts later on (for example, "Go to card 'Average

Tip of the Month: Control Panels Folder

If you miss the style of control panels System 6 had (which let you scroll through a list), you can easily simulate it in System 7. Here's how:

1. Choose Control Panels from the Apple menu.
2. Choose By Icon from the View menu.
3. Grab the lower right-hand corner of the window, and make the window as narrow as you can.
4. Choose Clean Up by Name from the Special menu while holding down the Option key.

5. Click on the zoom box in the upper right-hand corner of the window.

Now the Control Panels window is the width of the name of the control panel with the longest name and as tall as your screen. The control panels are in alphabetical order and you can scroll through them just as you could under System 6. Or you can just type the first few characters of a control-panel name and jump right to it. Then just press Command-O to access that control panel.

Juan Montoya
New York, NY

POWER TOOLS TIP SHEET

Scores"). You should avoid using numbers to identify cards ("Go to Card 4," for instance), because any card added in front of that card will take on that number and will cause your script to take you to the wrong card.

Reader Tips

File Sharing

Here's a quick and easy way to mount an AppleShare or AppleTalk Remote volume under System 7.

First, mount the volume through AppleShare, using the Chooser as you normally would. Once you've mounted the volume, make an alias of it and drag the alias to the Apple Menu Items folder on your hard disk. Then, whenever you want to mount that

AppleShare volume, double-click on the alias or select it from your Apple menu to automatically bring up the AppleShare window and mount the volume. Launching an alias of an AppleTalk Remote volume automatically dials the phone number for the remote volume.

You might want to keep a Network folder containing aliases for all of your networked volumes in the Apple Menu Items folder so that you can access them all through the Apple menu.

Vicki Marshall
Studio City, CA

Excel 4.0

If you've ever had to insert rows at the end of a summed column, you have probably noticed that the SUM formula does not automatically adjust

to include the additional rows. You can force the formula to include and calculate the additional rows if you insert the new rows just above — rather than below — the last row with data in the column being summed. If the new rows *must* be at the bottom of the column being summed, simply copy the last row, paste it somewhere else in the column, and delete it from its original position. (If you cut and paste the row, the SUM formula won't work properly, so make sure you copy and paste instead.)

Steven W. Tueller
Pleasant Grove, UT

ClarisWorks

Whenever you launch ClarisWorks, you usually have to wait for a dialog box that lets you select the type of

file you want to open. The dialog box lists the ClarisWorks environments in the following order: Word Processing, Graphics, Database, Spreadsheet, and Communications. You can speed things up a bit by making your selection *before* the dialog box appears.

Here's how: When you see the credits screen after you launch ClarisWorks, press the down-arrow keys one time or more to select the environment in which you're going to work, and press Return. For example, to open a spreadsheet, press the down-arrow key three times and then press the Return key as soon as you see the opening credits screen. (Word Processing is the default environment, so just press Return at the credits screen to automatically open

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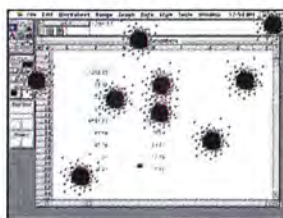
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a word-processing document.) After this, you'll see the dialog box for only a split second before you can begin working in your chosen environment.

Frederick Fernandez
San Diego, CA

System 7 Desktop

I'm always looking for more-efficient ways to organize my System 7 desktop. Like many people, I like to leave aliases of the files, programs, and folders I use the most on the desktop for easy access, but doing so takes up a lot of space. Some people delete the icons, leaving only the filenames, but I think icons are useful because they can help you pick out files more quickly than you can with only filenames. Here's the compromise I came up with.

Open a file in ResEdit; copy

the small icon from the ics8, ics4, or ics# resource; and paste this icon in as the new icon in the alias's Get Info dialog box. I then assign a two-character name to each alias — for example, AM for the Apple Menu Items folder.

Sean McKay
Portland, OR

System 7 Finder

Without having to do a lot of navigating to find them, I like my main folders to appear in the dialog boxes of the various applications I use. I also like to keep a clean desktop without a lot of aliases or folders cluttering it.

Here's a tip that can keep your most important folders off your desktop and yet visible in any Open or Save dialog box. Create an alias of each file or folder you want to

be listed in your dialog boxes, move the aliases to your desktop, and then use CE Software's DiskTop or a similar utility to make them invisible.

After you restart, these folders no longer show up on the desktop but they are listed and accessible from within the dialog boxes of your applications when you select the desktop.

Bill Weiss
Des Plaines, IL

ZTerm 0.9

You can set the modem speed in ZTerm 0.9 without opening the Connection dialog box.

A string at the bottom of the ZTerm window reports the modem speed, parity, data bits, and stop bits. If you click on this string, you'll get a pop-up menu for changing the

modem speed on the fly.

Leslie Jones
Maryville, TN

Screen Savers

I'm a software developer, and I have found that running unfinished applications often leaves the screen in an unseemly state. Some other unruly programs, such as PageMaker, leave areas of the desktop screwed up because they don't always redraw the screen properly. Here's how to solve these problems.

If you have a screen saver installed, move the mouse to the "Sleep Now" corner of the screen just long enough for the screen saver to start. Then move the mouse out of the corner, and the entire screen will be forced to redraw.

Jim C. Martin
Redmond, WA

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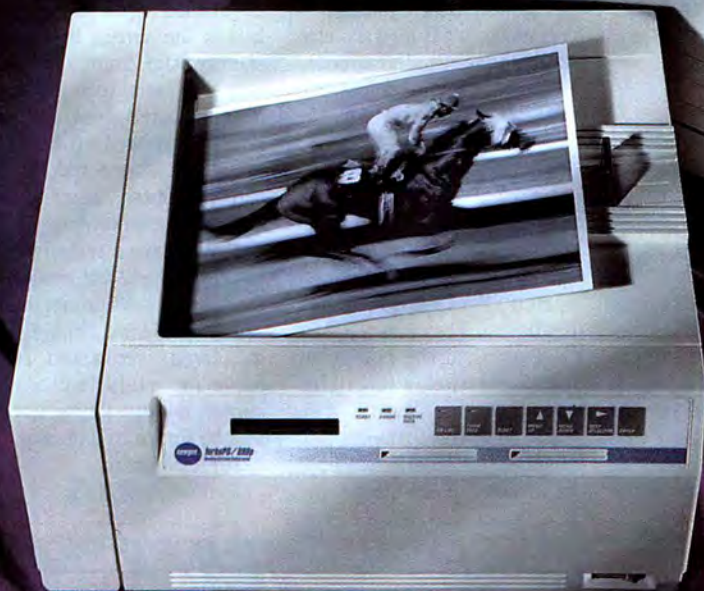
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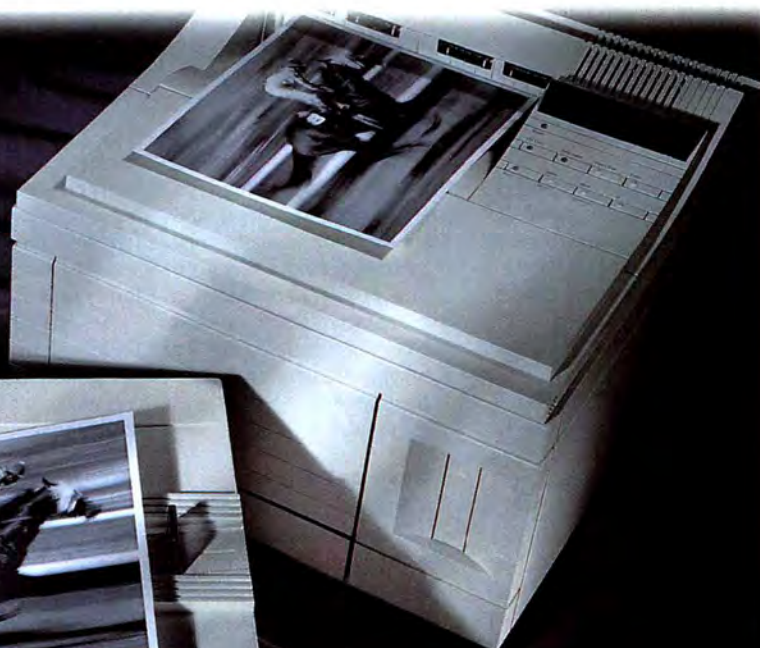
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By Bob LeVitus and Andy Ihnatko

Silence of the Chimes, Revisited

January '93's "Silence of the Chimes" (page 260) elicited more reader mail than any other letter in recent memory. Although you can't silence the startup chime, Jean Gustin and Josh Wardell both wrote to tell us that you *can* make the startup chime quieter by setting the volume to 0 in the Sound control panel before you shut down. Doing so didn't silence any of our computers — a Quadra, an LC, a PowerBook 170, and a IIfx — but it did make the startup chord somewhat softer.

Doug Bourquin had another solution for desktop Macs: Buy a pair of inexpensive amplified speakers that you can turn on and off. Plug the speakers in to your Mac, and then use the on/off switch to silence the chime.

Nathan Ng suggests connecting your Mac to the AUX In jack of your stereo system. When you want big sound

from your Mac, flick the switch to AUX and hold onto your hat. However, if you listen to the radio, cassette, or CD player (or turn the stereo off), the chime and all other Mac sounds will be silent.

David Kunkel says he plugs an old-fashioned monophonic earphone in to his Mac, which reduces the chime to a dull roar. I bet the headphones for your Sony Walkman would work almost as well.

Thanks to everyone who came up with a solution to this perplexing problem.

Where Did My RAM Go?

Q. I recently upgraded my Mac IIfx from 12 megabytes of RAM to 32 megabytes, because of all the pesky "not enough memory to do that" messages I was getting.

Unfortunately, the system software seems to have gobbled up all the new RAM I installed! When I'm in the Finder and choose About This

Macintosh from the Apple menu, it says that my system software takes 27 megabytes of RAM and there is no more memory in the largest unused block of memory than there was before I upgraded. And I still get the "not enough memory..." messages I got when I was running on 12 megabytes of RAM.

Doug Selley
Ottawa, Ontario
Canada

Bob: You need to turn on 32-bit addressing. Open the Memory control panel, turn 32-bit addressing on, and then restart your Mac.

Thirty-two-bit addressing is the System 7 feature that makes it possible for a Mac to recognize more than 8 megabytes of RAM. When you have more than 8 megabytes and 32-bit addressing is off, the telltale symptoms are that the number you see in About This Macintosh for the largest unused block of memory is smaller than it should be

*... But Were Afraid to Ask

Each month in this introduction, I try to convince you of the importance of simplicity in all its forms. So although I have here a page or two of notes that combine both the wisdom of the world's leading philosophers and the latest research figures promoting the use of simple questions and answers, I'm not going to use any of this data. Why? Because, first, to make use of voluminous notes would constitute an oxymoron in light of my central thesis of simplicity, and second, it's almost time for *Batman: The Animated Series* and today it's a two-parter with Catwoman and Red Claw. So I'll just enter my usual plea for simple, basic questions.

To keep you safe from those who prefer the *X-Men* cartoon, I'll say your query was sent in by an instigator of the First Crusade, as introduced by Tasso in his epic tome *Gerusalemme Liberata*.

Q. While cleaning out a desk, I came across a four year-old box of disks containing all of my scholarly output. I began to wonder how long the data on these things will stay good. Will I be able to hand my son one of my disks 15 years from now, so he can cheat when it's time for *him* to write a paper on Kafka?

Pietro l'Eremita
1050 - 1115

Andy: Well, Pietro, unfortunately you've asked one of those imponderable questions, as telephone calls to three different

media manufacturers yielded three different answers. Company A categorically said that the data's good for about five years; company B said it's more like seven; and company C said that both companies A and B were nuts and claimed that it still had some 3.5-inch floppies from its very first batch — and the data was still good after ten years.

For what it's worth, the oldest Mac disks I own (a MacDraw data disk that I personally formatted in mid-1984 and a shrinkwrapped copy of *Through the Looking Glass*, which is probably a bit older than that) worked just fine after I dusted them off and chonked 'em into a modern drive. I dug out a PC-DOS disk, circa 1982, which also worked. The coup de grace: A bunch of Apple II disks I'd formatted more than ten years ago booted and ran with flying colors once I remembered where I had stashed my Apple II language card.

What does this mean? Maybe nothing; an Apple DOS disk is exceptionally low-density by modern standards and as such is much harder than a modern floppy disk, which stores ten times as much data. With any magnetic media, data starts to wander over time. If enough data hits the trail, the disk is history.

My advice is to move data to new media after about eight years. If long-term storage is a concern, buy a rewritable optical drive; it's very nearly immune to magnetic drift and uses the safest storage medium currently available.

and the number for the memory occupied by the system software is larger than it should be. Turn 32-bit addressing back on, and your additional RAM will magically reappear.

Directory Assistance

Q. The last time I used Norton Utilities for the Macintosh, Disk Doctor reported that it had found a problem in the disk's directory, and it described the problem like this: "Part of the disk's extents tree (node #5) was found to contain some invalid information (incorrect FABN)." I tried to repair it but couldn't.

This problem doesn't seem to affect the performance of the CPU, except that when I tried to optimize the hard disk with Norton's Speed Disk software, I got the following message: "The directories on this disk are confused. Several files share the same file number, even though the number is supposed to be unique. It is unwise to optimize the disk in this condition."

Now what? How do I solve this problem?

Aloysius Laksono
Jakarta
Indonesia

Bob: An informed technical discussion of nodes and extents appears in the back of the Norton manual in a chapter entitled "Norton Disk Companion." Read it if you're interested in the nitty-gritty details of what's wrong. The bottom line is that the invalid node in the extents tree is bad news. If you don't correct the problem, chances are you will lose data.

Fortunately, an invalid node can usually be corrected by this simple procedure: Perform a complete backup from your hard disk, format and initialize the hard disk, and then restore from your backup.

That'll fix the node problem, but you're not entirely out of the woods yet. Once

you're back up and running, it's possible that you'll discover some files that won't open or that crash when you use them. If that's the case, chances are the files were trashed by the node/extents problem before you backed up. If you have another, older backup, try restoring those files from the old backup. If you don't have an old backup, you're probably out of luck.

Formatting and initializing your hard disk is the only sure way I know to cure mangled nodes. If you don't fix it, I can pretty much guarantee you're going to lose data in the future.

Piggy in the Middle

Q. While I was using ResEdit 2.1.1 on my Mac II, I opened the ALRT resource and found some rather interesting alerts (see Figure 1).

The question, of course, is simple: *What's pig-mode?* If it makes the Mac oink, how do you turn it on?

James A. Mowreader
Fort Drum, NY

Andy: A bit of humor here, sensation seekers. If you select About ResEdit whilst holding down the Command, Option, and Shift keys, ResEdit will oink up a storm and then ask if you want to put ResEdit into pig-mode. If you click on OK, then instead of keeping segments of the program open while you use them, ResEdit will compress and uncompress itself over and over again — and your Mac will slow down to a viscous drool. You can turn off pig-mode the same way you turned it on.

According to a text file (by someone named Russell Street) I once downloaded, if you run ResEdit off a floppy and engage pig-mode, ResEdit will oink continuously. It crashed my humble system when I tried it, but I offer this account as an anecdote if nothing more.

Bob: Aha! Andy comes through again. I always wondered what the heck pig-mode was for. Thanks.

The \$800 Lava Lamp

Q. Can you tell me how to get psychedelic rainbows out of my NEC MultiSync monitor? Blame it on Spaceship Warlock: I thought the soundtrack was really cool, so I plugged my portable stereo's speakers in to my Mac and put one on either side of the monitor, just as I've seen it done in all those ads for Mac multimedia. The sound was great, but the magnets from the speakers put colorful explosions onto the edges of the screen and I just can't get them out!

Mike Reisling
Case, WY

Andy: The best way to learn something is to do it wrong and damn the consequences, which is why, as a general rule, I try to learn on *other* people's computers.

Those festive adornments were indeed created by the magnetic fields of your speakers, but fret not: If they really bother you, you can remove 'em easily enough. If they're fairly recent, they might just go away on their own, provided you leave your monitor turned off overnight. If that doesn't work, you'll have to degauss the screen — that is,

remove the magnetic nastiness from it. Many of the high-rent monitors have a built-in degaussing button; on the Apple color monitors, it's a fat button at the back adorned with a horseshoe magnet with a line through it. When you push this button, it makes the sort of sound effect they used in "The Three Stooges" when one of the boys accidentally electrocuted himself. Push it in for a second or three, and your screen should return to normal.

If your screen doesn't have a degaussing button, you can still remove those rainbows by trotting down to your local Radio Shack and buying a bulk tape eraser, a fist-sized box that erases disks and tapes by blitzing their magnetic field. If you wave its business end over the affected areas of your screen, it ought to fix things up real good (but keep it away from your floppy disks).

For bonus points, let's talk about those special computer speakers you can buy. By now you've gathered that they're all magnetically shielded, so — unless you don't mind keeping your noncomputer speakers at least a foot away from your screen — they're *de rigueur* for multimedia use. There are a bunch of shielded speakers with built-in amplifiers available — and they're certainly neat and compact pieces of hardware — but I'll take the opportunity to plug the HD 5v speakers (\$85 each), from Boston Acoustics (617-592-9000). These are shielded speakers designed to sit atop a TV set in a home-theater setup, but they're still relatively compact and offer much better sound than any other multimedia speakers I've heard so far. They're also generally cheaper, even when you buy a little Radio Shack amplifier to use with them.

Bob: I've seen those Boston Acoustic speakers, and



Figure 1: If you select About ResEdit while holding down the Command, Option, and Shift keys, ResEdit will go into pig-mode (with sound effects), which will drastically slow down your Mac.

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they're a bit too big to fit on my desk. Plus they require a separate amplifier. That's why I prefer my MacSpeakers (\$199.95 per pair), from Personal Technologies (415-871-6000). Designed specifically for use with a Mac, these speakers are small and sound great. They're packed with such features as a built-in 10-watt-per-channel amplifier, external controls for bass and volume, simulated stereo, and sturdy shielded cases. And because they're shielded, you can place 'em right on top of your monitor or stick 'em to the sides of your monitor with the included Velcro fasteners.

Up and ATM

Q. I recently purchased my first laser printer. Before I decided on this printer, I called the local sales rep to make sure that the 45 fonts that came with the printer would work with Adobe Type Manager. I was assured that they would. Well, I brought the printer home, hooked it up, installed the screen fonts with Suitcase II, and then discovered that all the built-in outline fonts looked terrible *on-screen* at large point sizes. Is there any utility that will allow ATM to access the outline information in my printer? Is this common with all PostScript printers? Getting 45 fonts sounded great, but ATM has spoiled me. I'm disappointed.

Bill Marler
Los Angeles, CA

Bob: I don't think the sales rep was intentionally trying to mislead you, because this is how all PostScript printers are sold. I hasten to add that the rep isn't *totally* blameless, though. Although the screen fonts work with ATM when it comes to printing, screen fonts without their associated outline-font files don't support ATM for on-screen viewing. The rep could have informed you of that.

Here's the deal: PostScript

fonts are made up of two major components — the screen font and the outline font (sometimes known as the printer font or the downloadable font). When you buy a PostScript printer, the manufacturer gives you a set of screen fonts but no outline fonts. This makes sense. You don't need outline fonts to use the printer, because they're built in to it. Unfortunately, ATM throws a wrench into the works, because it can't render a font smoothly on your screen *without* the outline font. So the rep wasn't all wrong. The screen fonts work great with ATM for printing, but as you've noticed, they don't look so hot on-screen.

I don't know of any utility that can extract the outline font from your printer's ROM or allow ATM to access outline-font information from the printer. If there were, it would probably be illegal. Sorry, Bill. That's just the way things work.

By the way, some fonts try to confuse things by including a third component, an Adobe Font Metrics (AFM) file. Just drag it into your System Folder, and forget about it. If you use MasterJuggler or Suitcase II, you can drag the AFM file into the folder that contains your font's screen- and outline-font files. AFM files are not particularly relevant to this discussion, but if I didn't at least mention them, I know I'd get protest letters.

Serial Drama

Q. Recently my office upgraded its computer system from a scattered collection of PCs and Macs into a fully integrated network with printers and file servers. This was good news for me, because I'm one of the company's biggest Mac fans and also because the company now has two or three non-networkable IBM PostScript printers in

storage, one of which I hope I can snag for my own home use.

The question is, How do I get one of the IBM PostScript printers to work with my Mac IIci? It doesn't have any place to plug in an AppleTalk connector, of course, but it does have a serial port. Whether I plug it in to my Mac's printer port via a standard serial-printer (ImageWriter) cable or with a parallel-to-serial converter, all I get is plain line-printer-type output. I can't seem to get the IBM printer to work as a PostScript printer at all. Any ideas?

Mary Ellison
Lynn, MA

Andy: For starters, just about any PostScript printer with a serial port can work just fine with the Mac. PostScript is PostScript, after all, so it's not as big a problem as getting a third-party dot-matrix printer to work properly. Contrary to what one might guess, the LaserWriter driver that shipped with your Mac isn't specifically for Apple laser printers but is instead a more-or-less-generic PostScript driver. The only trouble is, it's designed to work with PostScript printers that have been plugged in via AppleTalk, which effectively puts the kibosh on any attempts to get it to work with non-AppleTalk printers.

But this being, for the most part, America, there are options. For starters, make sure the printer has been configured properly for PostScript operation. Most printers designed for PCs have two discrete operating modes: one for PostScript and another for emulating a run-of-the-mill line printer (most likely it'll emulate some flavor of HP LaserJet). From what you say, it sounds like your printer is in run-of-the-mill mode.

The best solution is to get yourself a copy of Apple's little-known Asynchronous

LaserWriter Driver, available for free from on-line services, your local user group, and specially marked boxes of Captain Crunch cereal. Toss it into your System Folder and select it in the Chooser, and you'll be able to print to that non-LaserWriter via a standard serial ImageWriter cable instead of an AppleTalk connection. The Asynchronous LaserWriter Driver is a few years old, so its System 7 compatibility is dodgy at best, but if it works, it works great. (In fact, you can set up the driver to print to a LaserWriter connected to a modem, which I'm sure will impress anyone who doesn't understand the concept of a fax modem.) Even if you do have an AppleTalked PostScript printer, you might want to give the Asynchronous LaserWriter Driver a look-see for office use; it lacks some of the whistles and bells of the most current LaserWriter driver, but because it uses the printer's serial port and not the network port, the printer will be invisible to everyone else on the net, so it'll truly be *your* printer.

There's also a clever, cumbersome, and very fiddly solution, which is to send PostScript code directly to the printer. Print your document with the standard LaserWriter driver, using the driver's Destination: PostScript File option. Then, with that non-networkable printer hooked up with the ImageWriter cable, use any PostScript-downloading utility (such as Adobe's free Font Downloader) or a plain telecom program to send that PostScript file to the printer. It ought to print out just fine. It's a very tedious method, however, and it's attractive only if (a) you can't find the Asynchronous LaserWriter Driver or (b) you want to make your misappropriated laser printer so hard to use that your coworkers won't want to use it. ☐

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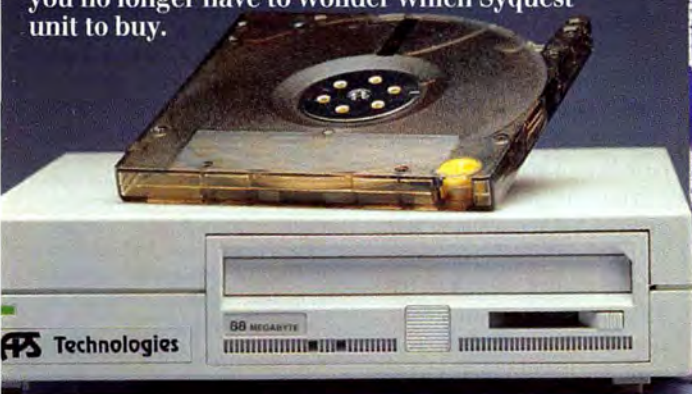
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This Month on ZiffNet/Mac

Zmac Reviews

ZiffNet/Mac has hundreds of programs, from games to system extensions to word processors, that are available free or for a nominal fee to the developer if you decide to keep the program. To help you decide which programs to download, we'll review interesting programs in this space on a regular basis.

The three programs we examine this month are available from ZiffNet/Mac's Download & Support Forum (GO ZMC:DOWNTech). The CompuServe filename and library name are in parentheses. Shareware can also be obtained from other online services, BBSs (bulletin-board services), and user groups.



Bolo ttt½

Bolo (filename BOLO.SEA, Library 1, Applications) is a tank game, similar to the commercial game Spectre, that you can play against your friends and colleagues on an AppleTalk network. You maneuver through obstacles, blowing a path through walls and trees to get at caches of ammunition. Frequently, you encounter potshots from gun emplacements, and using a sight on your own gun to gauge the distance to a target, you can lob a few of your own.

Dexterity and practice are required to take aim and shoot before shells pierce your armor. Bolo's rich set of sound

effects include a sinking noise that occurs when your tank traverses rivers or lakes. Although Bolo is a simple shoot-'em-up game, being able to play it against friends (who may soon become mortal enemies) makes it a lot more fun than playing on your own.



ClipClop ttt½

ClipClop (filename CLIPCL.SEA, Library 1, Applications) is just what you need if you've ever been stymied by being able to copy only one item at a time to the Clipboard. This handy application runs in the background under System 6 or 7 and stores each new PICT or piece of text that you copy to separate clipboards within the ClipClop application. Even

though copying is relatively seamless, you have to switch to the ClipClop application and bring the appropriate window to the front to paste an item back into a document. A series of key combinations that allows you to select a ClipClop clipboard without switching applications would have been a better approach.

You can export the contents of any ClipClop window to a file, but you can't append files to one another. You can try out ClipClop for two weeks free of charge; after that, you must pay the \$14 registration fee to receive an activation code and manual. ClipClop is extremely useful for editing large documents, but it needs a little tweaking to make it a must-have utility.

HOT UTILITY

WindowRanger, this month's *MacUser* utility, lets you use a menu command — rather than search through the clutter on your Mac's desktop — to locate any open window. WindowRanger puts a Window menu, which lists every open folder or disk, on the Finder's menu bar. Simply select the window you want, and WindowRanger brings it forward. At your discretion, you can have WindowRanger add a Window menu to any application that does not already have one, you can exclude an application from having the Window menu added, or you can turn off this feature entirely through the WindowRanger control panel.

The program also lets you view a window's pathname (which folders a particular folder resides in) within the window's title bar. Programmers and scripters will appreciate the ability to automatically copy the pathname to the Clipboard, which is useful for making disk-access calls from within a script or program.

WindowRanger was created by Robert Mah, best known for helping develop the commercial personal-finance program WealthBuilder (from Reality Technologies). You can reach Robert on ZiffNet/Mac at 76437,320. WindowRanger is available exclusively on ZiffNet/Mac and, under the membership fee, is available free for one month. Until April 25, 1993, type GO ZMC:POWERTOOLS. After that, find the file WINRAN.SIT in Library 3 of the MacUser Forum (GO ZMC:MACUSER).

Zmac News

RSI Newsletter

Repetitive-strain injuries (RSIs), such as carpal-tunnel syndrome, are the scourge of the computer era — everyone is wearing a wrist brace these days. An electronic newsletter has emerged to provide the latest information on equipment, therapies, and exercises for RSI sufferers. Issues 1 through 9 of the *RSI Newsletter* are available on ZiffNet/Mac (filename RSI1-9.SEA). You can organize and view the newsletter by using the EasyView shareware text viewer. Download & Support Forum, Library 7.



ZipIt tttt

ZipIt (filename ZIPIT.SEA, Library 1, Applications) takes the popular DOS-based Zip compression standard and lets you expand and archive files with it on the Mac. For anyone who needs to transfer files between Macs and PCs, this is an essential tool.

ZipIt works in much the same way as the familiar Mac compression program Compact Pro. However, you can also choose from a host of options, including such Mac niceties as stripping out line feeds from text files and keeping Mac file attributes intact by switching on MacBinary coding. The current version of ZipIt can decompress PKZip 2.x files — the most popular version of the DOS Zip standard. ZipIt fills a need that hasn't been addressed by commercial compression software. The \$10 shareware fee gets you a password that turns on the encryption feature.

By Ben Templin

Direct Line

For many of you, mail order is your primary means of purchasing Macintosh products and services. That's why MacUser has put together the following special section.

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DT-2112	1050 Megs	3.9 ms	3.50	◀▶
DT-1528	1340 Megs	4.1 ms	5.25 FH	
DT-1908	1400 Megs	3.9 ms	5.25 FH	◀▶
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Using Magnet is easy. All you have to do is tell Magnet what files to find, what to do once you've found them, and when. Magnet will pull them all together and carry out your instructions — and Magnet works in the background on a prearranged schedule so you can be attending to more important things as it reliably performs the tasks requested such as:

- **Creating a Magnet.** Just tell Magnet what to find, determine the magnet's action and tell it when to run.
- **Backup Magnets.** You can create several backup magnets to back up files meeting specified criteria. Let's say you want to create a backup magnet that will back up files in a certain "backup folder" or will back up documents that have been modified in the past week. With Magnet, it's no problem.
- **Automatic Remote File Retrieval.** One of Magnet's most powerful features. Gives you the ability to have one Mac log onto another, find the desired files, and log off the volume — all automatically with AppleTalk Access Remote and FileShare. A quick solution to increasing productivity.
- **Synchronize Magnets.** Magnet has made the process of creating synchronize magnets very easy by adding a menu option which automatically synchronizes the two folders you specify.

Magnet finds files with multi-attribute searches of local disks and servers without building an index. Schedule backups to occur automatically at convenient times, have Magnet clean up your desktop and file everything away correctly! Keep your desktop Mac and PowerBook synchronized so you always have the latest information at your fingertips on both machines.

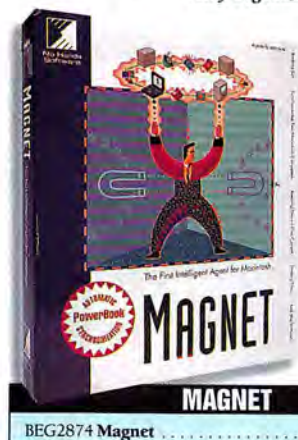
Magnet is smart, fast and easy to use. The perfect tool for the computer user who wants all the details taken care of — quickly and automatically.

The Attractions Of Magnet. Magnet gives you all the benefits of the most advanced agent technology in an easy-to-use package.

- **Save Time.** Magnet automates routine tasks on a regular basis so you can spend time on more important work.

- **Stay Organized.** Magnet will clean your desktop regularly so you can find files quickly and efficiently.

- **Keep a Step Ahead.** If you're using two computers or working on a network, Magnet will continually update your hard disk with the most recent versions of all accessible files.



BEG2874 Magnet \$89.95

Dial-In Networking Made Easy

The name is Shiva. A company that is renowned for remote networking solutions for workgroups and enterprise networks. Shiva pioneered the advanced dial-in remote networking technology for AppleTalk networks — and today, their second-generation networking products (with special PowerBook features) handle the most demanding jobs in corporate America.



LocalTalk access. Uses ordinary phone lines along with standard Hayes compatible modems.

NetModem/E

The speedbump of the Shiva NetModems has a built-in high-speed 14,400 bps modem. Remote dial-in, dial-out and network-to-network capabilities. You can access all network resources quickly, transparently — and securely — via phone line. Instantly connects to Ethernet and sends standard AppleTalk and Network packets right over a regular phone line! Share files and printers; send and receive e-mail messages, schedule meetings. NetModem/E joins geographically separated networks. Workgroups can reach beyond their offices!

NetModem/E consists of a dedicated communications processor, a high-speed modem with V.32bis and V.42bis support, and a built-in Ethernet interface. Supports both PCs and Macintosh computers on Novell NetWare and AppleTalk networks. NetModem/E switches automatically to accommodate PCs and Macintoshes for each of the three application areas.

User Profiles. TV Guide, Chuck Fletcher. TV Guide, one of the most widely read publications in the U.S., recently installed Shiva's NetModem/E to provide dial-in and dial-out capabilities for its Ethernet network.

Editors and production staffers in the magazine's production department can dial-in from home or from any remote location and access files, transfer information or check electronic mail.

According to Production Systems Specialist Chuck Fletcher, "We used to use Timbuktu, but it was really expensive and hard to coordinate. We had to pay per node, and many weren't used every day. It really wasn't cost-effective for us."

In addition, NetModem/E has allowed multiple users to share a modem over the network for dial-out, instead of the constant interruptions Fletcher used to encounter as the owner of the department's



Dial-in from remote sites for full network access. Dial-out from the network over a single shared phone line and connect separate networks to form an internetwork.

sole modem. "Now we can hook up multiple machines to the NetModem/E I used to have people knocking on my door all day long; if I was in the middle of something, it had to be put on hold so they could dial-out. Now they can access the modem from their own machine," Fletcher says.

NetModemV.32

NetModemV.32 is a standalone communications device designed to meet three LAN communications needs. It allows remote Macintosh users to dial in and have full access to AppleTalk network services; lets Macintoshes dial out to remote information services or hosts; and joins geographically separated networks in a routing connection over ordinary phone lines. NetModem V.32 includes a Hayes-compatible, high-speed modem with V.32 (9600 bps) support, and a built-in LocalTalk.

TeleBridge

An advanced, standalone communications device that delivers dial-in, dial-out and remote routing for LocalTalk networks. Allows dial-in from remote PowerBooks or Mac for full network access. Dial-out from the network over a single, shared phone line; and connect separate networks to form an internetwork. Connects directly to the network without dedicated computers and supports System 6.0.7 or later with

LanRover/L

LanRover/L is a dial-in server that provides PowerBook and Macintosh users with fast, easy, dial-in access to all network services, and shared dial-out to electronic forums and bulletin boards. With LanRover/L, users can connect to an AppleTalk network and have full access to network resources such as file servers, electronic mail, and groupware applications.

LanRover/E

LanRover/E is a flexible, expandable AppleTalk Remote Access (ARA) server that provides remote users with high-performance, easy-to-use access to Ethernet networks. It offers network administrators the advantages of low cost, scalability, centralized management and dial-in security in a compact, rack-mountable package.

It's the perfect solution for businesses that are expanding into remote networking and find they need a viable, manageable, inexpensive approach.

FastPath 5 Gateway (10BaseT)

A dedicated high performance LocalTalk-Ethernet hardware router, carefully optimized for the complexities of multiprotocol routing. Routes AppleTalk Phase 1 and Phase 2, TCP/IP, DECnet, IP/Talk and NFS — more protocols than any other LocalTalk-Ethernet router available. Rack-mountable.

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But Tiger isn't stopping there — we've also assembled another bundle for PC users: Get Trax MIDI Windows software, Trax Song Collection and the handsome Miracle Carrying Bag — all for just an additional \$49! Hurry — we're giving away the store and supplies won't last long...

Yes, it is a Miracle! Just sit down and learn how to play — progressing at your own speed, guided by the best software implementation I've ever seen. The Miracle's keyboard is second-rate; it's the beautifully designed screens and carefully crafted



lessons that have you pouring out the tunes in just minutes. It's a software masterpiece — and I've seen plenty of software!

The fact is, the Miracle is a brilliant teaching tool, highly visual and a lot of fun for aspiring musicians of any age — with the Miracle, it's never too late to learn.

If it sounds like I'm gushing all over about the Miracle — I apologize, but it's the most fun I've had with my computer in a while. Imagine sitting down — with no musical background at all — and playing "Chariots of Fire" or "Don't Be Cruel" in minutes! There's nothing like making music — it is one of the most wonderful accomplishments in the world.

...And the Miracle makes it happen. Here's how:

First, you enter the "Conservatory," where you enroll and begin with the basics: how to sit, how to hold your hands and the location of the notes. Each lesson teaches you a little bit more — simple melodies, names of notes and more. There are 40 chapters in all and you can't move to the next lesson until you've proven yourself on the current lesson. The computer knows exactly what you're playing at all times, charting your accuracy and adjusting the lessons to your level of progress.

During your lessons, you can click to "go to" the Arcade for some fun-and-games practice sessions. Like the shooting range that knocks off ducks when you hit the right notes. You'll learn to play chords as parachutists jump out of a plane and learn melodies by repeating back what the Miracle plays. It's so much fun that you'll actually forget you're learning. The next thing you know, you'll be playing your favorite songs.

Or "go to" the Studio to record your own songs on an 8-track recorder (or play along with a symphony orchestra). The Studio provides over 120 instruments to choose from. It's the most amazing thing I've ever seen!

The Practice Room gives you a place to sharpen your skills or rehearse a particular tune until it's perfect, and the Performance Hall puts you on the stage for a formal concert.

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1. For how many micro computers do you buy products?
(check one)

☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

2. Your primary job function is: (check one)

☐ 01) Administrative/ ☐ 03) Engineering/R&D
 General Management ☐ 04) Finance/Accounting
☐ 02) MIS/DP, Communications ☐ 05) Marketing/Sales
 Systems, Programming ☐ 06) Computer Dealer/VAR

3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

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 Accounting ☐ 01 ☐ 01
 Spreadsheets ☐ 02 ☐ 02
 Project Managers ☐ 03 ☐ 03
 Word Processors ☐ 04 ☐ 04
 Database Managers ☐ 05 ☐ 05
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 Utilities ☐ 09 ☐ 09

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 Monitors/Displays
 Storage
 Add-in Boards
 Networking

Q3 Q4

☐ 10 ☐ 10
☐ 11 ☐ 11
☐ 12 ☐ 12
☐ 13 ☐ 13
☐ 14 ☐ 14
☐ 15 ☐ 15
☐ 16 ☐ 16
☐ 17 ☐ 17

5. If so, what function do you serve in the buying process?
(check all that apply)

☐ 01) Initiation/ Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)

☐ 01) over \$5 million ☐ 05) \$50,000 - \$99,999
☐ 02) \$1 - 5 million ☐ 06) \$10,000 - \$49,999
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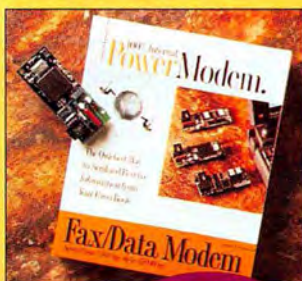
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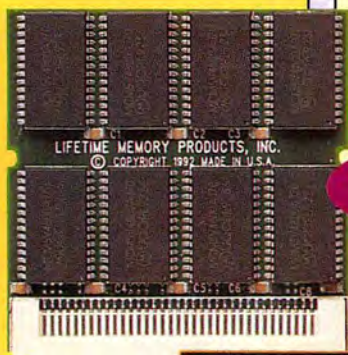
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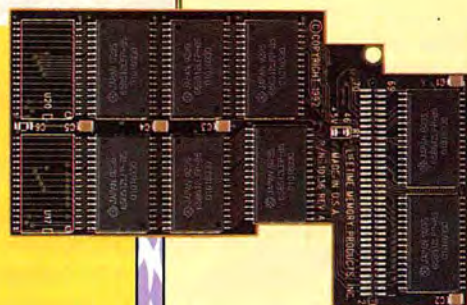


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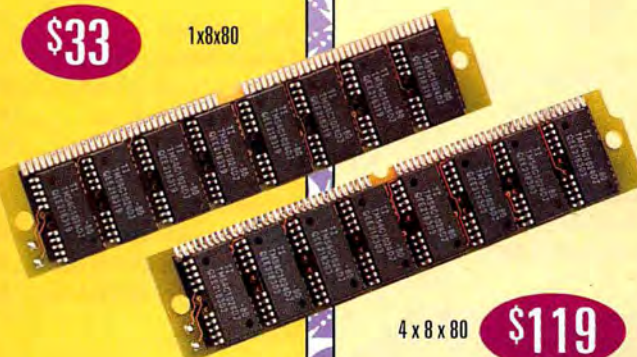
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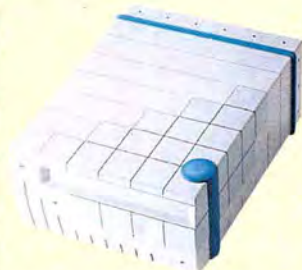
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272 May 1993 MacUser



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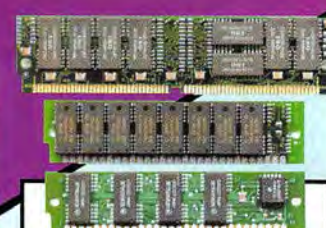
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3142...COMstation Two - 24/96 V.42bis.....	247
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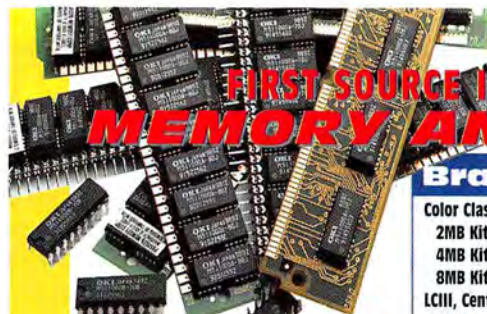


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16 x 8-70ns FX	\$485

Brand New

Color Classic	
2MB Kit	PN N/A \$62
4MB Kit	PN N/A \$122
8MB Kit	PN N/A \$250
LCIII, Centris 610 and 650	
4MB	M1507LL-A \$159
8MB	M1508LL-A \$279
16MB	PN N/A \$599
32MB	PN N/A \$2299

Fax Modems

COMPUTER PERIPHERALS, INC.



ViVa External Modems for Macintosh

- 14,400bps V.32/V.42bis modem w/14,400bps send and receive Fax \$299
- 9600bps modem with send/rec FAX \$99
- 2400bps modem w/9600bps send/4800bps receive FAX-class I for Mac \$89

Quadra

Quadra Video Ram	
512K Kit	M5953LL-A \$49
Quadra 900, 950	
64MB Kit	PN N/A \$1899
Quadra 800	
4MB	M1507LL \$149
8MB	M1508LL \$289
16MB	PN N/A \$629
32MB	PN N/A \$2399
Quadra 700 (Low profile)	
64MB Kit	PN N/A \$2160

PowerBook

PowerBook 100, 140, 145 and 170	
2MB	M1032LL-A \$80
PowerBook 100	
4MB	M1033LLA \$170
6MB	PN N/A \$239
PowerBook 140, 145 and 170	
4MB	M1033LLA \$149
6MB	PN N/A \$199
PowerBook 160 and 180	
4MB	M4664LLA \$189
6MB	PN N/A \$249
8MB	PN N/A \$339
10MB	PN N/A \$419
PowerBook Duo 210 and 230	
4MB	M4184LL/A \$209
8MB	M4185LL/A \$349

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88R SyQuest Drive.....\$449
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45MB SyQuest Disk.....\$69
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LABS**
Bottom Line Pick

MAGIC CD-ROM INCLUDES A 1-YEAR WARRANTY & THE MACPRODUCTS 30-DAY MONEY-BACK GUARANTEE.

Toshiba XM3401.....\$599
Multi-Spin, Multi-Session, Photo CD Compatible
100 Ms Average Access, 300 Kb/s Data Transfer Rate

Toshiba Bundle.....\$649
Toshiba XM3401 bundled with six new CD-ROM packages to get your started

CIRCLE 138 ON READER SERVICE CARD.

MAGIC OPTICAL

"THIS IS THE CHEAPEST, AND ONE OF THE FASTEST OPTICAL DRIVES WE TESTED, WITH EXCELLENT TECHNICAL SUPPORT TO BOOT."
-MACWORLD NOVEMBER '92

MACWORLD
MW
EDITORS' CHOICE

Preformatted Optical Cartridges
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256MB.....\$99

"THE BEST DESIGN AND CONSTRUCTION FOR THE MONEY."
-MACUSER JULY '92

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128MB FUJITSU

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EXTERNAL VERSION \$999

\$949

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35 MS AVERAGE SEEK TIME
EDUCATIONAL RATES AVAILABLE

128MB EPSON

768 KB/S TRANSFER
34 MS AVERAGE SEEK
EXTERNAL \$1199

\$1099



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SINCE INTRODUCING THE MAGIC SYQUEST FOUR YEARS AGO, MACPRODUCTS USA HAS LEAD THE MARKET IN REMOVABLE STORAGE TECHNOLOGY. AND WE WILL CONTINUE TO LEAD. YOU CAN COUNT ON MAGIC.

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We offer you the best overall value, customer service, technical support, and financing options...because we're interested in being your total solutions partner...and because we'll be around to help you.

We've become known as America's one-stop source for Macintosh solutions. Why? Because our friendly sales and customer service teams have always been more interested in solving your computing challenges than in making a quick buck. From time to time, they have to talk a customer out of buying more equipment than they really need. That's because we believe in building relationships and providing total solutions...and that's why we're America's largest mail order seller of Mac hardware.

Réal Provencher
Réal Provencher, President

HARDWARE THAT FITS



E-MACHINES



SUPERMAC

Monitors: all sizes, brands & prices

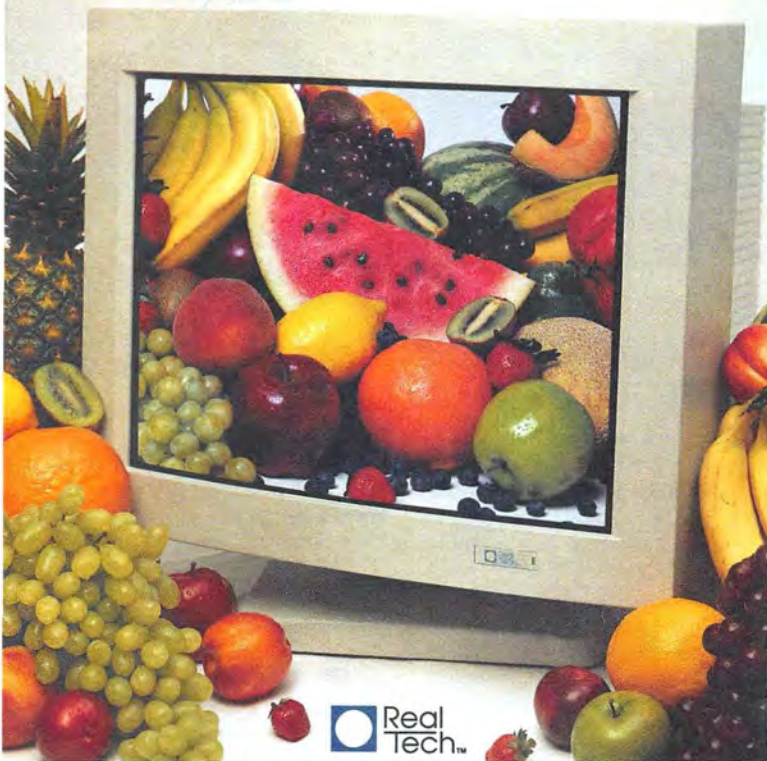
Need help choosing a monitor? Not sure if you need one that auto-syncs? Call our friendly sales team. They're happy to answer your questions.

	Price	Tube type	640 x 480	640 x 870	832 x 624	1024 x 768	1152 x 870	Auto-syncing	Anti-glare
A. Radius 21" Color	\$3,069	Hitachi					■		■
NEC 21" 6FG Color	2,429	NEC	■		■	■	■	■	
SuperMac 21" Mono/Grayscale	989	—					■		■
B. SuperMac 20" (SuperMatch)	\$1,499	Hitachi				■			■
C. RasterOps 20" Trinitron Multi-Mode	2,329	Trinitron	■		■	■	■	■	■
D. RealTech 20" Trinitron Multi-Mode	1,895	Trinitron	■		■	■	■	■	■
Radius Precision Color 20"	2,389	Trinitron	■		■	■	■	■	■
RasterOps 20" Hitachi Color	1,469	Hitachi	■		■	■	■	■	■
* SuperMac 20" (SuperMatch Dual-Mode)	2,499	Trinitron				■	■		■
E-Machines 19" Color (T19 II)	2,399	Trinitron				■	■	■	■
E. Mitsubishi 17" Diamond Pro	\$1,199	Trinitron	■		■	■	■	■	■
F. NEC 17" 5FG Color	1,329	NEC	■		■	■	■	■	
G. Sony 17"	1,149	Trinitron	■		■	■		■	■
H. RealTech 17" Multi-Mode	995	Hitachi	■		■	■		■	■
I. Seiko Instruments 17" CM1760LR	1,249	Trinitron	■		■	■		■	■
J. RasterOps 16" (RasterOps Sweet 16)	\$1,249	Panasonic			■				■
* E-Machines 16" Color (ColorPage T16)	1,299	Trinitron	■		■	■		■	■
K. NEC 15" 4FG Color	789	NEC	■		■	■		■	
L. Radius 15" Precision Color Pivot	\$959	Non-Trinitron	■	■	■	■		■	■
M. Sigma 15" Grayscale (PageView GS)	579	Phillips		■					■
N. RealTech 15" Grayscale	449	—		■					■
Sigma 15" Grayscale (Power Portrait)	659	Phillips		■					■
NEC 15" 3FGX Color	669	NEC	■		■	■		■	
O. Seiko Instruments 14" Color (CM1445)	\$499	Trinitron	■						■
P. Sony 13" Color	689	Trinitron	■						■

* shown above

Your Hardware That Fits partner will tell you which monitors are on-board compatible, and which ones require a card.

Your one-stop source for



Real Tech 20" Trinitron Color Monitor

\$1,895

Lease: \$52/mo.

- Auto-syncing
- 24- or 8-bit color
- Multi-mode display
- 7 factory pre-set resolutions
- 7 programmable settings
- 1024 x 768 standard resolution
- Trinitron® tube from Sony

1024 x 768 standard resolution; will auto-sync to 640 x 480, 832 x 624, 1024 x 768, and 1152 x 870. Multi-level bit depth support provides accurate screen display for all applications. Will interface with Quadras, and with popular video cards.

“ In the graphic design business, the desktop publishing hardware is changing so rapidly that it can be confusing what to buy — Jon’s knowledgeable and friendly help guided me toward the right decision for my company. ”

— Elaine Kropveld
EKlectic Images

Real Tech 17" Multi-Mode Color Monitor



\$995

Lease: \$27/mo.

- Multi-mode
- Auto-syncs to 1024 x 768
- 832 x 624 standard resolution
- Quadra-ready



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\$489

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Precise, real-time control over graphic input...brings back the delight of freehand drawing!

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The standard tablet has a plain surface. The electrostatic tablet is ideal for video graphics, photo retouching, and print pre-press work.

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Wacom (SD Series)

6" x 9" Standard	\$489
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12" x 18" Electrostatic	1099

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Seated, left to right: Paul and Craig. Standing: Chris, Tom, Dan, Mike, and Dave.



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When you order from us, you get computer experts, not clerks!

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NOTE: Minimum lease payment is \$50 per month.

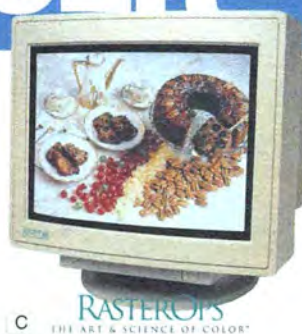
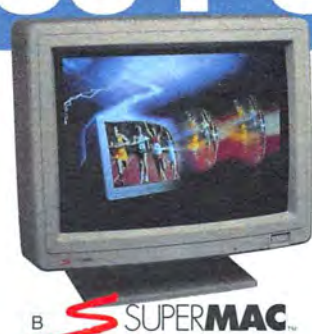
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1-800-364-USER

TOLL-FREE TECH SUPPORT:
1-800-364-MAC



Don't know which card
is compatible with
your CPU & monitor?
Call us toll-free.

	Price	Maximum resolution	Accelerated
RASTEROPS			
ProColor 32	\$3,219	1152 x 870	■
PaintBoard 24	1,599	1152 x 870	■
8XL	479	1152 x 870	■
PaintBoard Li (24)	829	1024 x 768	■
24STV*	799	640 x 480	■
MediaTime*	1,599	640 x 480	■
SUPERMAC			
Spectrum/24 PDQ Plus	\$1,549	1152 x 870	■
Spectrum/8 NuBus	419	1152 x 870	■
Spectrum/24 Series IV	829	1024 x 768	■
Spectrum/8•24 PDQ	829	640 x 480	■
Spectrum/8•24	579	640 x 480	■
Video Spigot*	369	160 x 120	■
Video Spigot & Sound*	479	160 x 120	■
RADIUS			
Precision Color 24X	\$1,649	1152 x 882	■
Precision Color 8XJ	499	1152 x 882	■
Precision Color 24XK	829	1024 x 768	■
Precision Color 24XP	499	832 x 624	■
Video Vision*	1,979	640 x 480	■
E-MACHINES			
ColorLink DC/T (8-bit with Ethernet)	519	1024 x 768	■
ColorLink SX/2 (24-bit with Ethernet)	649	1024 x 768	■
Futura SX24	499	1024 x 768	■
DoubleColor LX (8)	699	1152 x 870	■

*24-bit; captures up to 30 frames per second



monitors!

Hours: 8 am-7 pm Central Standard Time

30-DAY MONEY-BACK GUARANTEE on all hardware (except printer consumables and special-order items). Before returning merchandise, call our Customer Service Dept. toll-free to receive a returned merchandise authorization number (RMA), which must be included with any products you return. No C.O.D. returns, please. Thank you for your cooperation. ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE. Hardware That Fits is located at 610 S. Frazier in Conroe, Texas 77301.

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Scanners

Flatbed desktop scanners for 24-bit color, 8-bit grayscale, and black/white images. Ideal for mid-range output or position prints for mockups/presentations.

	Price	DPI	Brightness & contrast levels	Scanning area	Flat art	Transparencies	Slides	Software
MICROTEK								
Scanmaker II	\$909	600	14	8.5 x 13.5	■			Includes limited version of Adobe Photoshop
Scanmaker IIxE	1,179	600	14	8.5 x 13.5	■			Includes full version of Adobe Photoshop
Scanmaker 1850 Slide Scanner Transparency Option	1,569	1850 (1850)	14 (14)	2.5 square inches			■	Includes full version of Adobe Photoshop
REALTECH								
Scan 800	\$1,099	800	200	8.5 x 11.75	■			Includes Scan-Match color calibration software
Optional Adobe Photoshop	200							
Scan 800 with Transparency Option	1,595	800	200	8.5 x 11.75	■	■		
UMAX								
UC 630	\$1,179	600	51	8.5 x 14	■			Includes full version of Adobe Photoshop
Transparency Option	729	(600)	(51)	6 x 9	■	■	■	
UC 840	1,329	800	51	8.5 x 14	■			Includes full version of Adobe Photoshop
Transparency Option	729	(800)	(51)	6 x 9	■	■	■	

SII Seiko Instruments Personal ColorPoint PSE

\$2,699
Lease: \$73/mo.

Prints full-bleed comps on plain laser paper (up to 10.1x14.33) or transparency film. 300 dpi color thermal printer uses 16 MHz RISC processor. 5 Mb RAM standard, upgradable to 9 or 21 Mb. Adobe PostScript® compatible. Includes AppleTalk, parallel, and RS-232 interfaces, plus an optional SCSI port. Continuously polls all interfaces;

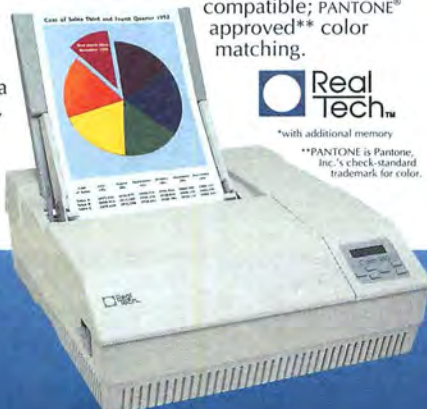


reconfigures automatically. 17 resident fonts.

RASTEROPS®
THE ART & SCIENCE OF COLOR™
\$8,099 Lease: \$222/mo.

RasterOps CorrectPrint 300i Dye Sublimation Printer with 36 Mb

Uses a 4-color (CMYK) dye sublimation thermal process at 300 dpi for photographic-quality output. Prints on special sheeted paper or transparencies, not on rolls. 8.1" x 11" image size on legal paper. Uses a RISC controller, 35 resident fonts, three interfaces, including TCP/IP.



RealTech Color 350 **\$5,995**
Lease: \$164/mo.

Prints 11x17 (OB size)* 300 dpi edge-to-edge comps for about \$1.13 per page. (Letter-size output, approx. 69¢ each.) Creates true black text—uses 4 colored ink sheets (CMYK). RISC processor. 10 Mb of RAM, upgradable to 18 or 34 Mb. 3 standard interfaces. 39 resident fonts. Adobe PostScript® compatible; PANTONE® approved** color matching.



*With additional memory

**PANTONE is Pantone, Inc.'s check-standard trademark for color.



The photo above is a 300 dpi image of an 8 x 10 transparency. It was scanned on the RealTech Scan 800 with the Transparency Option (shown below), then adjusted with ScanMatch and color-corrected with Adobe Photoshop.

MICROTEK

Real Tech Real Tech Scan 800 with Transparency Option



MICROTEK

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you'll get the best value
& highest quality from us

How many pages do you print each month? What page-per-minute speed do you require? We only sell printers that can handle your needs. If you don't see what you want listed here, please call us toll-free.

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Real Tech Laser	\$1595
NEC Silentwriter 95	1399
NEC Silentwriter 95fx	1879
NEC Silentwriter 97	1719
NEC Silentwriter 97fx	2199
NewGen PS660	2699
NewGen PS880P	2119
Texas Instruments PS17	1249
Texas Instruments Turbo	1595

TABLOID SIZE

Real Tech 400	\$3195
NewGen 660B	4059
QMS 860	4279
NewGen 660B with Ethernet	4499

COLOR

Real Tech Color 350	\$5995
Seiko Instruments Personal ColorPoint PSE	2699
QMS 210	4699
RasterOps Correct Print 300i	8099

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The right printer can do wonders for your productivity. Do you need speed? Adobe PostScript Level 2? Do you need to print a lot of pages each month?

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Engine speed
RAM

Interpreter
Microprocessor

Duty cycle
Paper trays

SCSI port
Interfaces

Resident fonts
Misc.

Do you need to print complex graphics on a daily basis or large quantities of high-quality, time-sensitive documents? We can recommend the right printer for your needs.

NEC Silentwriter Model 95

\$1,399

Lease: \$38/month

- 300 dpi
- 6 pages/min.
- 2 Mb RAM (expandable to 5 Mb)

- Adobe PostScript Level 2
- Motorola 68000 processor

- 6,000 pages per month
- Built-in envelope feeder & 250-sheet tray; optional 2nd tray available in letter or legal sizes

- No SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 35 Micro-fine toner and NEC's patented "Sharp Edge" technology create sharp black print quality

NEC



RealTech



- 300 dpi
- 9 pages/min.
- 2 Mb RAM (expandable to 10 Mb)

- Adobe PostScript Level 2
- Weitek RISC processor

- 5,000 pages per month
- Optional 2nd paper tray & cassette feeder are available for \$250 (for both)

- SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 35 ATM font rendering technology builds raw type characters 4 to 5 times faster, enabling the RealTech Laser to print complex documents faster than other printers in its price range.

RealTech Laser

\$1,595

Lease: \$44/month

★★★★★ 1/2

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"The RealTech features not just a genuine Adobe interpreter, but also a PostScript Level 2 raster image processor (RIP), which earns it more than a few points for forward compatibility."

— PUBLISH MAGAZINE, Feb. 1992

Texas Instruments MicroLaser XL Turbo

\$2,795

Lease: \$77/month

- 300 dpi
- 16 pages/min.
- 2.5 Mb RAM (expandable to 10.5 Mb)

- Adobe PostScript Level 2
- Weitek RISC processor

- 25,000 pages per month
- Optional 2nd paper drawer

- Optional SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 35

TEXAS INSTRUMENTS



Texas Instruments MicroLaser Plus

\$1,249

Lease: \$34/month

- 300 dpi
- 9 pages/min.
- 1.5 Mb RAM (expandable to 4.5 Mb)

- Adobe PostScript Level 1
- Motorola 68000 processor

- 10,000 pages per month
- Optional 2nd paper drawer and envelope feeder

- Optional SCSI port
- Appletalk RS-422, parallel, and RS-232C

- 17 Available with 35 resident fonts (\$1349)

NewGen 660B

\$4,059

Lease: \$111/month

newgen

- 600 dpi
- 8 ppm (letter size); 4.6 ppm (tabloid size)
- 12 Mb RAM (expandable to 96 Mb)

- PostScript compatible
- Weitek XL-8220 RISC processor

- 10,000 pages per month
- Optional 2nd paper drawer

- SCSI port
- Appletalk RS-422, parallel, RS-232C

- 35

The only 11x17 printer with Adobe PostScript Level 2 for less than \$3500.



- Choice of 300 or 400 dpi
- 15 ppm (letter size); 8 ppm (tabloid size)
- 4 Mb RAM (expandable to 16 Mb)

- Adobe PostScript Level 2
- Weitek RISC processor (and ATM font rendering technology)

- 30,000 pages per month
- Two paper trays included (one tray for letter size; one tray for tabloid size.)

- SCSI port
- Three interface ports: Appletalk RS-422, IBM PC parallel, and RS-232C.

- 35

Jeanne is thrilled that she can print proofs of her company newsletter on tabloid-size paper. No more tiling!

★★★★★ MACWORLD MAGAZINE September 1992

"...be forewarned: PostScript-clone printers still have a long way to go before they can rival true Adobe PostScript printers."

Quote from MacUser September 1992 issue, "Personal PostScript Printers" by Bruce Fraser.

RealTech
RealTech
Laser 400

\$3,195

Lease: \$88/mo.

QMS 860 Hammerhead

\$4,279

Lease: \$117/mo.

- 600 dpi
- 8 ppm (letter size); 4.6 ppm (tabloid size)
- 12 Mb RAM (expandable to 32)

- Adobe PostScript compatible
- Intel 80960CA RISC processor

- 10,000 pages per month
- Optional 2nd paper cassette

- SCSI port
- Optional Ethernet
- 39 fonts

Three interface ports: Appletalk RS-422, IBM PC parallel, and RS-232C.



1-800-364-USER

TOLL-FREE
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1-800-364-MACS



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FOR SPEED? CALL, AND
WE'LL MATCH YOU WITH
THE RIGHT ACCELERATOR.**

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NEW! Turbo 040 Accelerators

Get the maximum in 68040 acceleration and 100% compatibility. For Mac IIci and IIsi; includes math chip.

25 MHz Turbo 040	\$1099
33 MHz Turbo 040	1349
25 MHz FastCache Turbo 040	259
33 MHz FastCache Turbo 040	339

Universal PowerCache Accelerators

Math chip available.	
33 MHz Accelerator	\$379
40 MHz Accelerator	549
50 MHz Accelerator	719
PowerCache Adapter	40

Charger (Photoshop Accelerator)

Includes PicturePress 2.5, Charger Plug-ins, and Kodak Photo CD access with clip art images.	
Charger	\$799

RADIUS

radius

For the Mac II family. Includes QuickDraw and display-list acceleration software.

Radius Rocket 25i	\$1239
Radius Rocket 33	2069
SCSI II Booster	249
Rocket Share	419

FUSION DATA SYSTEMS

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TECHNOLOGY

CARDS AND HUBS



Asanté 10T Hub/8 (Ethernet concentrator)

Lets you use inexpensive unshielded twisted-pair (UTP) telephone wire instead of expensive coaxial cable for local area networks.

10Base-T Hub/8

\$265

Asanté EN/SC (SCSI-to-Ethernet adapter). For Macs without available slots.

EN/SC

\$339

Asanté MacCon 3 Ethernet card. Automatically configures to media used.

MacCon 3 Card

\$216

DaynaPORT E/II-T NuBus Card

Connects Mac II computers to thick, thin, fiber optic or 10Base-T Ethernet cable systems.

Includes an RJ-45 jack for 10Base-T wiring.

DaynaPORT E/II-T NuBus Card

\$149

DaynaPort E/Z. Ideal for Macs that don't have a slot for a network interface card.

DaynaPORT E/Z

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289

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SupraFax Modems include STF and Microphone software, and are backed by a 5-year warranty.

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179

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299

MassMicro FM 24/96 Network

359

MassMicro FM 24/96 Personal

165

Global Village TelePort-Gold

459

Global Village TelePort-Silver

399

Global Village TelePort-Bronze

209

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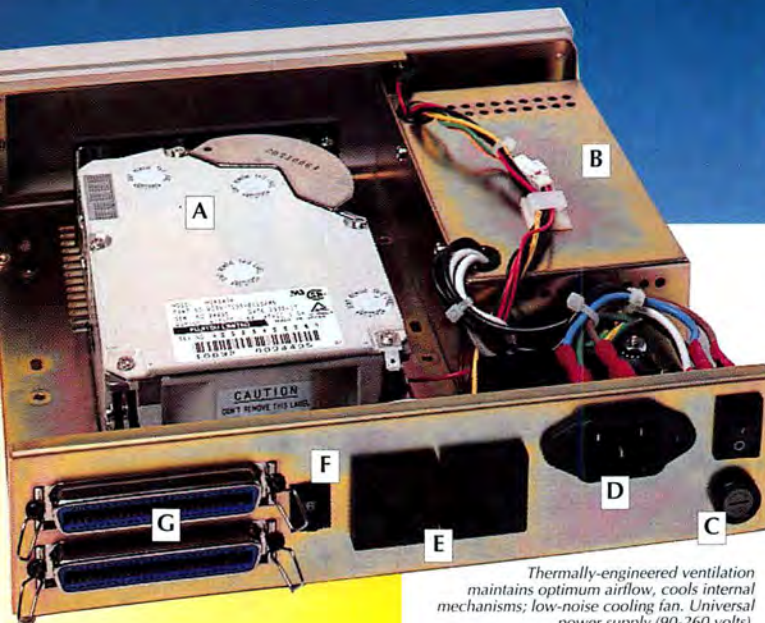
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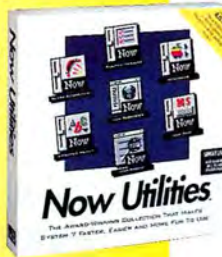
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	Model number	Price (Internal)	Price (External)	Formatted Mac capacity	Avg. access time	Transfer rate*	MTBF** (hours)	Form factor	Warranty (years)
1.1 - 3.6 Gb									
Fujitsu 1.2	M2266	\$1395	\$1495	1079 Mb	14.5 ms	3.0'	200,000	5.25 FH	5
HP 1.2	C2247	1589	1659	1000 Mb	10.5 ms	5.25'	300,000	3.5 HH	5
Micropolis 1.2	2112	1729	1799	1005 Mb	10 ms	5.0'	300,000	3.5 HH	5
Quantum 1.2	PRO1225	1599	1669	1200 Mb	10 ms	2.9'	350,000	3.5 HH	2
Seagate 1.2	ST41200N	1369	1469	999 Mb	15 ms	3.0'	150,000	5.25 FH	1
Toshiba 1.2	MK-538FB	1399	1469	1200 Mb	12.5 ms	4.0'	200,000	3.5 HH	5
Maxtor 1.24	LXT-1240	1999	2069	1240 Mb	9 ms	4.5'	300,000	3.5 HH	3
Conner 1.3	CP31370	\$2099	\$2199	1030 Mb	10.5 ms	6.0'	250,000	3.5 HH	1
Micropolis 1.5	M1528	2299	2399	1341 Mb	14.5 ms	2.9'	150,000	5.25 FH	5
Micropolis 1.6	M1548	2379	2479	1748 Mb	14 ms	4.75'	150,000	5.25 FH	5
Seagate 1.6	ST41651N	1899	1999	1352 Mb	15 ms	4.0'	150,000	5.25 FH	1
Fujitsu 2.0	M2252	\$2449	\$2549	1752 Mb	11 ms	4.75'	200,000	5.25 FH	5
Micropolis 2.0	M1924	2649	2749	2100 Mb	11.5 ms	4.76'	250,000	5.25 FH	5
Seagate 2.1	ST42100N	1999	2099	1900 Mb	12.9 ms	3.9'	300,000	5.25 FH	1
Seagate 2.4	ST42400N	2879	2979	2050 Mb	11 ms	4.5'	300,000	5.25 FH	5
HP 2.4	C3010	2899	2999	2000 Mb	11.5 ms	5.25'	300,000	5.25 FH	5
Seagate 3.4	ST43400N	3999	4099	2750 Mb	11 ms	6.0'	300,000	5.25 FH	5
Micropolis 3.6	M1936	4299	4399	3022 Mb	12 ms	6.0'	250,000	5.25 FH	5

* Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner. **MTBF=Mean Time Between Failure HH=Half Height FH=Full Height

† SCSI-2 ‡ SCSI-2 Fast These drives are most efficient when used with a Macintosh Quadra 800, 950 or a RealTech SCSI-2 card.

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	Model number	Price (Internal)	Price (External)	Formatted Mac capacity	Avg. access time	Transfer rate*	MTBF** (hours)	Form factor	Warranty (years)
40 - 120 Mb									
Quantum 42 ELS	ELS42	\$189	\$259	40 Mb	19 ms	1.4	250,000	3.5 LP	2
Conner 85	CP-30080E	225	295	82 Mb	17 ms	1.5	150,000	3.5 LP	1
Quantum 85 ELS	ELS85	219	289	82 Mb	17 ms	1.4	250,000	3.5 LP	2
Conner 120	CP-30100	279	349	116 Mb	19 ms	1.5	150,000	3.5 LP	1
Maxtor 120	7120XT	269	339	121 Mb	15 ms	1.5	150,000	3.5 LP	2
120 - 250 Mb									
Quantum 127	ELS127	\$289	\$359	124 Mb	17 ms	1.4	250,000	3.5 LP	2
Conner 170	CP-30170E	299	369	160 Mb	9 ms	1.5	150,000	3.5 LP	1
Quantum 170 ELS	ELS170	319	389	160 Mb	17 ms	1.4	250,000	3.5 LP	2
Conner 212	CP-30200	379	449	206 Mb	12 ms	2.5 ¹	150,000	3.5 LP	1
Maxtor 213	7213	379	449	202 Mb	15 ms	2.8	150,000	3.5 LP	2
Quantum 240	LPS240	419	489	234 Mb	10 ms	1.4	250,000	3.5 LP	2
Maxtor 245	7245	429	499	245.6 Mb	15 ms	3.0	150,000	3.5 LP	2
Seagate 248	ST3283N	519	589	235 Mb	12 ms	3.0 ²	250,000	3.5 LP	1
320 - 570 Mb									
Maxtor 340	LXT-340	\$649	\$719	324 Mb	15 ms	2.1 ¹	150,000	3.5 HH	2
Fujitsu 425	M2623FA	899	969	405 Mb	9 ms	2.7 ¹	200,000	3.5 HH	5
Seagate 426	ST1480N	919	989	426 Mb	14 ms	2.6 ¹	150,000	3.5 HH	1
Fujitsu 520	M2624FA	939	1009	496 Mb	9 ms	2.7 ¹	200,000	3.5 HH	5
Quantum 525 LPS	LPS525	989	1059	500 Mb	10 ms	3.2 ¹	250,000	3.5 LP	2
Seagate 525	ST1581N	1029	1099	525 Mb	14 ms	4.0 ²	150,000	3.5 HH	1
Maxtor 540	MXT-540	999	1069	546 Mb	9 ms	5.5 ²	300,000	3.5 HH	2
Conner 540	CP-3540	979	1049	515 Mb	12 ms	5.5 ²	150,000	3.5 HH	1
Micropolis 560	2105S	1129	1199	560 Mb	10 ms	5.0 ²	300,000	3.5 HH	5
660 Mb - 1.05 Gb									
Seagate 663	ST4766N	\$1119	\$1219	645 Mb	15.5 ms	1.8	150,000	5.25 FH	1
Seagate 676	ST4767N	1519	1619	645 Mb	11.9 ms	3.0 ¹	150,000	5.25 FH	1
HP 677	97556	1469	1569	620 Mb	13.5 ms	2.8 ¹	150,000	5.25 FH	5
Quantum 700	PRO700	1249	1319	700 Mb	10 ms	2.9 ¹	350,000	3.5 HH	2
Toshiba 877	MK-438FB	1099	1169	830 Mb	12.5 ms	3.0 ²	200,000	3.5 HH	2
Quantum 1050	PRO1050	1419	1489	1000 Mb	10 ms	2.9 ¹	350,000	3.5 HH	2
HP 1050	97558	2099	2169	987 Mb	13.5 ms	2.8 ¹	150,000	5.25 FH	5
Seagate 1050	ST11200N	1649	1719	1000 Mb	10.5 ms	5.1 ¹	200,000	3.5 HH	1

* Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner. **MTBF=Mean Time Between Failure LP=Low Profile HH=Half Height FH=Full Height

¹ SCSI-2 ² SCSI-2 Fast These drives are most efficient when used with a Macintosh Quadra 800, 950 or a RealTech SCSI-2 card.

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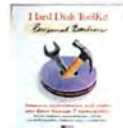
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Quantum



Unformatted Capacity	Model	Average Access	Actual MAC Capacity	Internal	External
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ELS, LPS, PRO drives carry a TWO Year Warranty. Go-Drives carry a ONE Year Warranty.

CONNER

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
85mb	CP30080E	3.5" Low Profile	17ms	82 mb	\$199	\$259
170mb	CP30170E	3.5" Low Profile	17ms	160 mb	\$289	\$349
212mb	CP30200	3.5" Low Profile	12ms	206 mb	\$369	\$429
540mb	CP30540	3.5" Low Profile	10ms	515 mb	\$899	\$959

Conner drives carry a ONE Year Warranty.

Maxtor

UP TO TWO YEAR WARRANTY



Unformatted Capacity	Model	Average Access	Actual MAC Capacity	Internal	External
XT SERIES (3.5" LOW PROFILE)					
120mb	7120XT	15ms	121mb	\$239	\$299
207mb	7213	15ms	202mb	\$355	\$415
LXT AND MXT SERIES (3.5" HALF HEIGHT)					
330mb	LXT-340	15ms	324mb	\$589	\$649
535mb	MXT-535	8.5ms	521mb	\$975	\$1035
1240mb	MXT-1240	8.5ms	1150mb	\$1599	\$1659
PANTHER SERIES (5.25" FULL HEIGHT)					
1.2GIG	PO-12S	13ms	997mb	\$1295	\$1395
1.7GIG	PO-17S	13ms	1433mb	\$1595	\$1695

Maxtor 3.5" Drives carry a ONE Year Warranty. Maxtor 5.25" Drives carry a TWO Year Warranty.

Seagate

FEATURING THE ... ELITE SERIES



Unformatted Capacity	Model	Description		Average Access	Actual MAC Capacity	Internal	External
1.6GiG	ST41651N	5.25" Full Ht	Wren-8	15ms	1350mb	\$1679	\$1779
2.1GiG	ST42100N	5.25" Full Ht	Wren-9	12.9ms	1900mb	\$1869	\$1969
1.6GiG	ST41600N	5.25" Full Ht	Elite-1	11.5ms	1307mb	\$1839	\$1939
2.4GiG	ST42400N	5.25" Full Ht	Elite-2	11ms	2050mb	\$2539	\$2639
3.4GiG	ST43400N	5.25" Full Ht	Elite-3	11ms	2750mb	\$3429	\$3529

Seagate Drives carry a ONE Year Warranty.

FIVE YEAR WARRANTY

FUJITSU

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
425mb	M2623SA	3.5" Half Height	9ms	405mb	\$895	\$955
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$945	\$1005
1.1GIG	M2694	3.5" Half Height	8.5ms	995mb	\$1695	\$1755
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	\$1375	\$1475
2.0GIG	M2652	5.25" Full Height	14.5ms	1600mb	\$2295	\$2395
2.4GIG	M2654	5.25" Full Height	11.5ms	2000mb	\$2499	\$2599

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600mb	Teac MT2ST/F50	Analog	CT600F	\$629	\$649
250mb	Archive Viper 250	Analog	DL6250	\$479	\$499
500mb	Archive Viper 500	Analog	DL6250	\$709	\$729
2.0GIG	Archive Python	DAT, DDS	4mm	\$1129	\$1149
3-5GIG	Archive Turbo DAT	DAT, DDS-DC	4mm	\$1339	\$1359
2.0GIG	HP 35470A	DAT, DDS	4mm	\$1329	\$1349
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	\$1529	\$1549

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CMO-3100E	Ricoh	128mb	3.5" Half Ht	45ms	\$1075
CMO-3051E	Ricoh	594/652mb	5.25" Full Ht	28ms	\$2345
NEW!!	Sharp	594/652mb	5.25" Full Ht	30ms	\$2295
TAHITI II	MaxOptix	650/1.0GIG	5.25" Full Ht	35ms	\$3195
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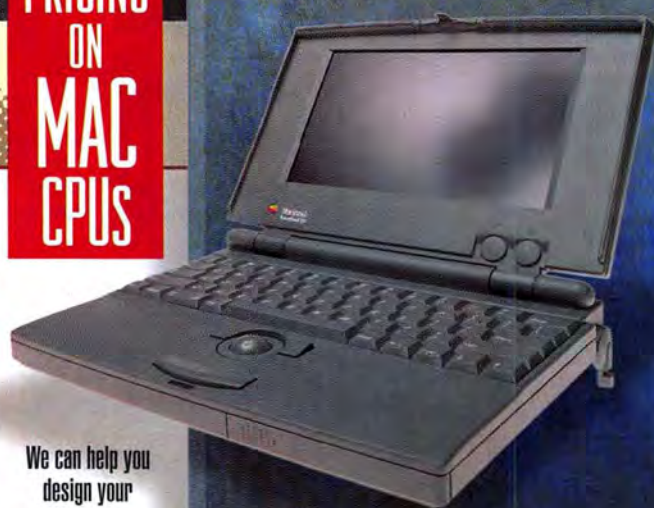
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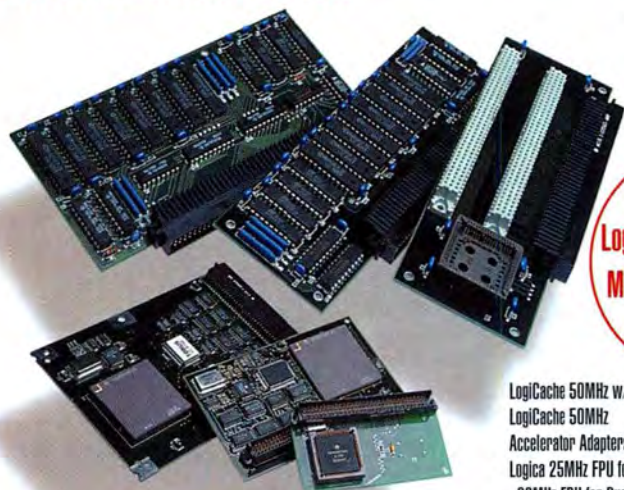
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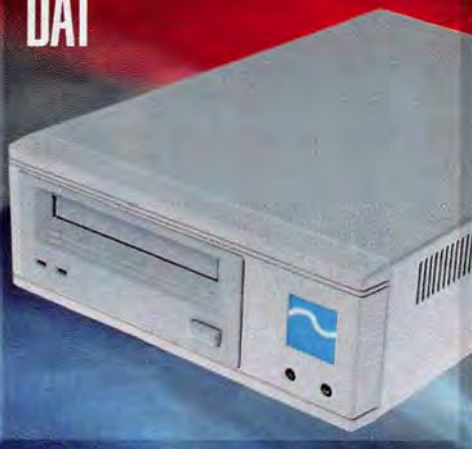
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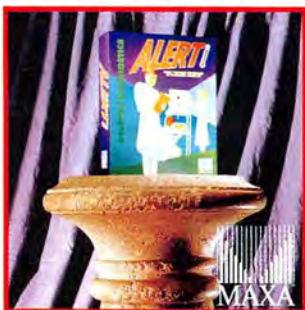
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LPS 240mb 10ms 3.5"TH	\$399	\$459
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Maxtor

Model	Speed	Size	External
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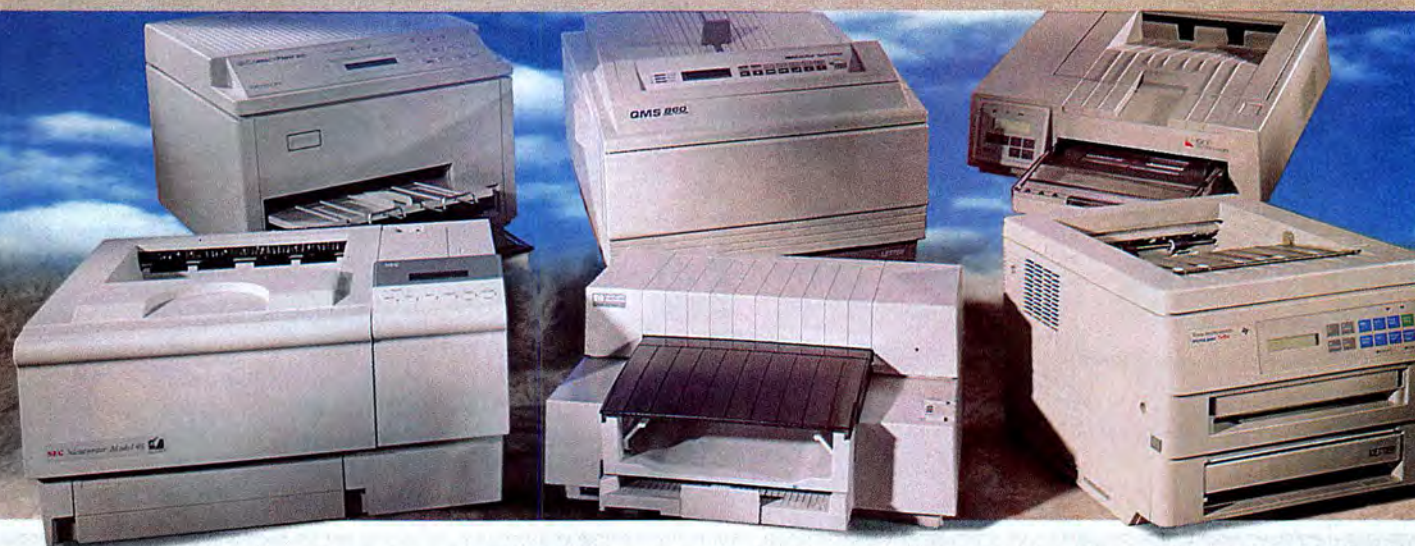
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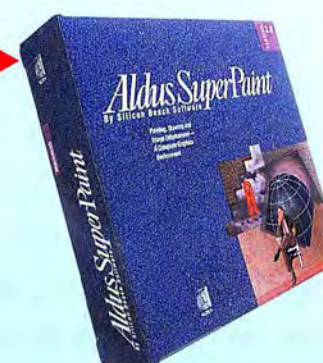
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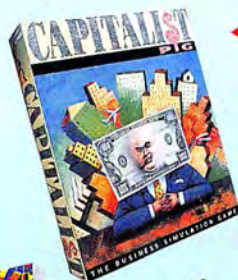


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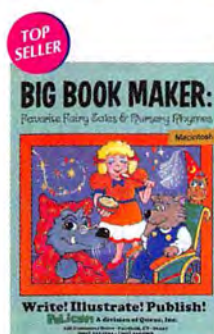
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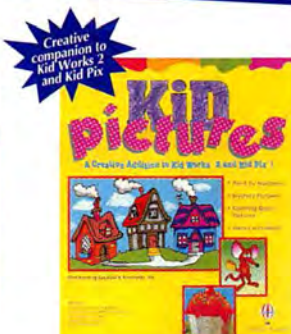
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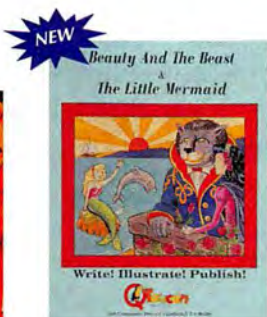
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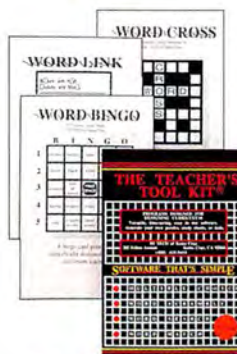
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All SyQuest drives feature 20MS average seek time, and 60,000 MTBF. Kits include one cartridge, external SCSI cable and formatting utility. All MacTown removeables and cartridges carry a one year warranty. Internal kits compatible with Quadra 900/950 models only.

Maxtor

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Maxtor drives feature 150,000 hours MTBF. MXT1240 drive features 300,000 MTBF. Maxtor drives include a two year warranty. Internal full-height drives for the MAC II, IIX, IIFX and Quadra 900/950 only.

OPTICAL

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170MB	ELS170/17MS	\$ 303	\$ 365
240MB	LPS240/10MS	\$ 478	\$ 448
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Quantum drives feature 100,000-200,000 hrs MTBF and a two year warranty.

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345-347

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Bar Coding
CD-Rom
Communications
Computer Systems
Data Acquisition
Disk Drives
Diskettes
General
Input Devices
Memory Upgrades
Networking
Peripherals
Power Supplies
Printers
Scanners
Security
Tape Drives
Used Equipment

PREMIER

320

CLASSIFIED

325

BUSINESSCARD

345

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Back Up Systems
Bar Coding
Business
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CAD/CAM
CD-ROM
Communications/Networking
Desktop Publishing
Educational
Emulation
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Financial
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General
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Language Tools
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Medical/Dental
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Networking
Personal Management
Programming Tools
Public Domain
Real Estate

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Recreation
Religion
Sales Marketing
Scientific
Security
Shareware
Statistics
Travel/Leisure
Utilities

MISCELLANEOUS

Accessories
Books/Catalogues
Business Opportunities
Consulting/Programming
Data Conversion Services
Data Recovery Services
Desktop Publishing Services
Diskette Copy Services
Furniture
Insurance
Novelties
On-line Services
Repair Services
Slide Imaging Services
Supplies
Training

PREMIER

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CLASSIFIED

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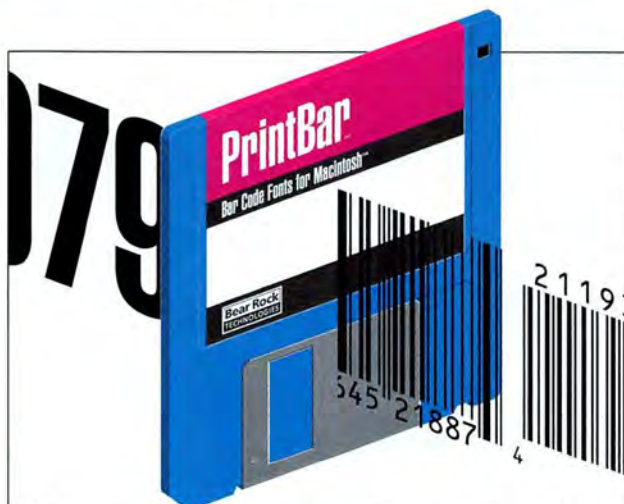
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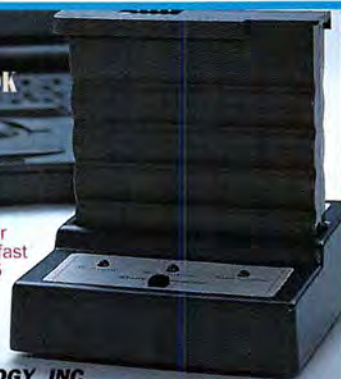
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Source: MacUser 1992 Study of Microcomputer Product Ownership and Buying Plans

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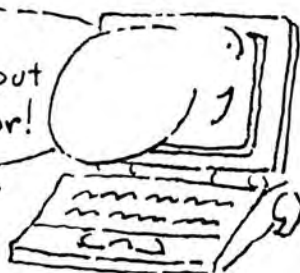
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Source: MacUser 1992 Study of Microcomputer Product Ownership and Buying Plans

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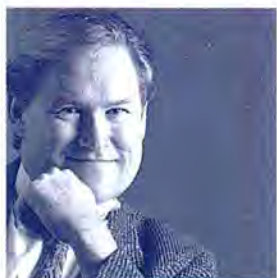
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Magic Bust



Whatever happened to the guys who created the Mac? They're still around, but the magic's gone.



We all know the legend: The Mac was created ten years ago by a bunch of workaholic geniuses, led by junior Svengali Steve Jobs. Those days are gone, though. Just how far gone became apparent to me after I watched the recent General Magic press conference in New York. General Magic is the company that now employs some of those early-Apple geniuses. I'm still not exactly sure what General Magic does. All I know is that this particular event featured a lot of mulish old men from the likes of AT&T, Motorola, Philips, and Sony seated onstage, mumbling meaningless nonsense about the future.

This collection of incredible bloat was enough to make anyone's teeth itch, especially after listening to each participant try to explain the importance of General Magic and its universal interconnectivity Rosetta-stone whizbang humma-humma nooka-nooka do-all chitchat flub-a-dub pop-goes-the-weasel world-compatible protocol — or whatever the heck it is. This unfinished software is supposed to make all the nonexistent wireless hand-held useless PDA gizmos talk to each other somehow. I was rolling on the floor, laughing. Sinsemilla, anyone?

Things got just plain freaky when Andy Hertzfeld was introduced to answer some vague question. Hertzfeld, best known for creating the original Macintosh system software and for giddy pro-Apple boosterism, has never been seen dressed in a suit. But now he's a cofounder of General Magic. He popped out of the audience in a skintight Italian suit — nervously looking and sounding like Al Capone's bookkeeper testifying before Congress.

Witnessing this mind-boggling press event somehow reminded me of the scene in which Darth Vader presents Luke Skywalker to the orange-eyed weirdo Emperor in *Revenge of the Jedi*. It was frightening.

For My Next Trick . . .

Well, you can imagine how stunned I was when, a week later, faded wunderkind Steve Jobs announced that NeXT would become a software company. How pathetic. Apparently Canon — inventor of the Canon CAT computer and other defunct toys — will buy out the hardware side of the business.


Is it just me, or has the world finally figured out that Bill Gates was right all along and software is where the action is? Well, it's

where the action is if you can't sell hardware, which is apparently the case with Mr. Jobs and his NeXT-generation computer. Of course, all he had was software anyway, thanks to Bud Tribble and some other masterful coders whom he burned out faster than a Billy Martin-managed baseball pitching staff.

Jobs also had the right vision, especially when compared with the Milquetoast vision of Bill Gates and his lame notion of Information at Your Fingertips. But now Bill has the bucks and the success, while Steve provides little more than a two-bit sideshow. Meanwhile, the Mac drifts rudderless toward some who-knows-where destination.

Unfortunately, even as a software company, NeXT will fade into oblivion, buried by Microsoft, IBM, and Apple as those companies fight to the death — with real money — over operating-system hegemony. Where does NeXT software fit in? Its best bet is to be sold to IBM. It contains a lot of nifty ideas and has a great look and feel. But it was based on some false premise Jobs concocted while knocking about in one of his cavernous abodes. Jobs assumed — with little or no data — that the flaky industry cycle of rejection and change was actually real and dependable, not fickle. According to plan, the Mac would be dead meat by 1992 or so and users would flock to anything new and better. Nice try.

In the same period that Jobs floundered, Microsoft's Windows, of all things, developed into a world killer. This turn of events obviously galls Jobs no end. Jobs must look at Windows — a klunky DOS shell feigning Mac capabilities — and compare it with NeXTStep and cry himself to sleep every night. Meanwhile, Bill Gates is giggling all the way to the bank.

It's now apparent that it won't be the grand vision of Steve Jobs or General Magic (or any other person or company influenced by the Mac godhead) that will rule the world. Instead, it's the careful, plodding Microsoft vision of blandness, tedium, and Windows device drivers that will win the mind-share battle. The magic is with Microsoft and nowhere else. It's hard to understand but easy to observe. A spell has been cast, and the deed is done. Andy Hertzfeld wears a suit, and Steve Jobs sells software. Whoever the witch is who did this may as well have turned them into toads. 

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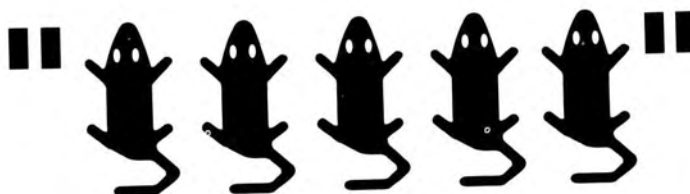
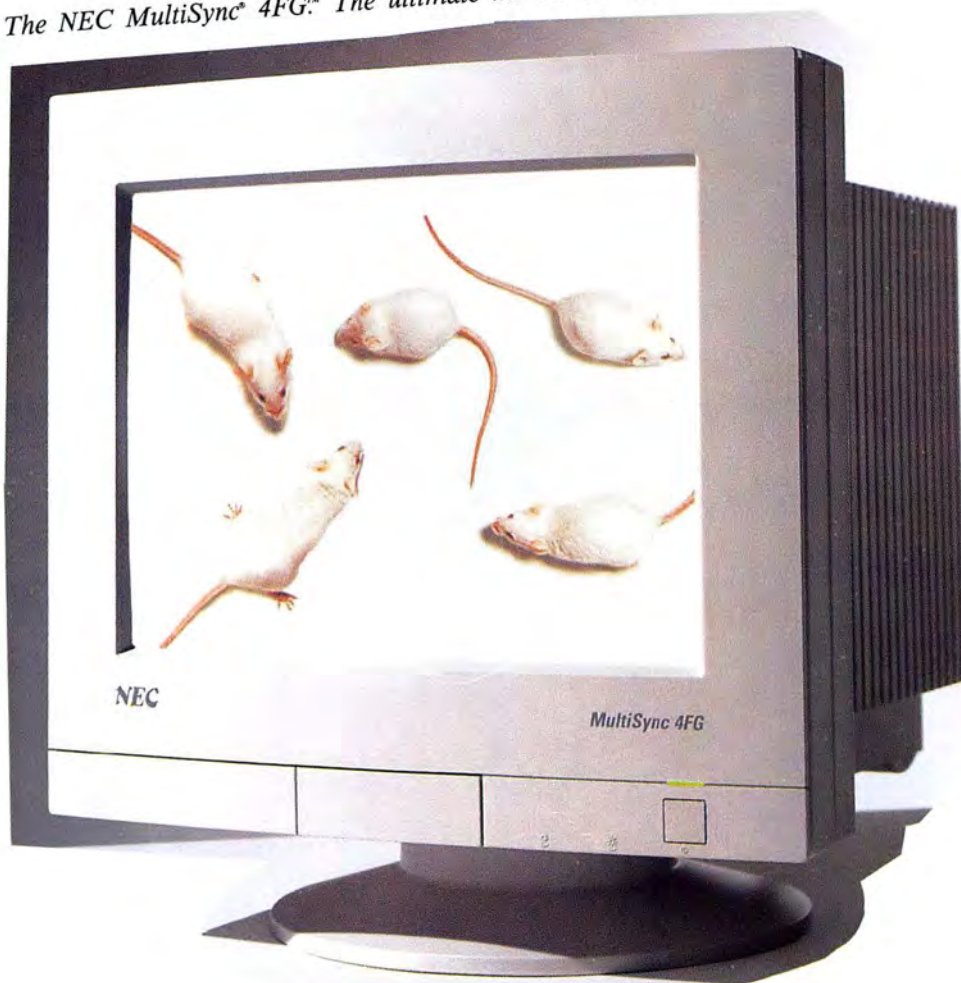
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